SPECIFICATION TITTLE

METROLOGY CALIBRATION PROCEDURE FOR THE

COMMUNICATIONS TECHNOLOGY C9925/A REPAIR TEST SET

EQUIPMENT SERVICES CENTER

METROLOGY DEPARTMENT

PRODUCTION ENGINEERING - ESC		
Prepared by Curt V. Casto cvc		Date 07/10/91
Approved by Equipment Services Superintendetedent		Date
Approved by Equipment Services Manager		Date
Issue 1.0	Spec. No. EPC 900.009	Sh. 01 of 21

VENTURA FILE
EPC90009

ISSUE STATUS SPECIFICATION

EPC 900.009

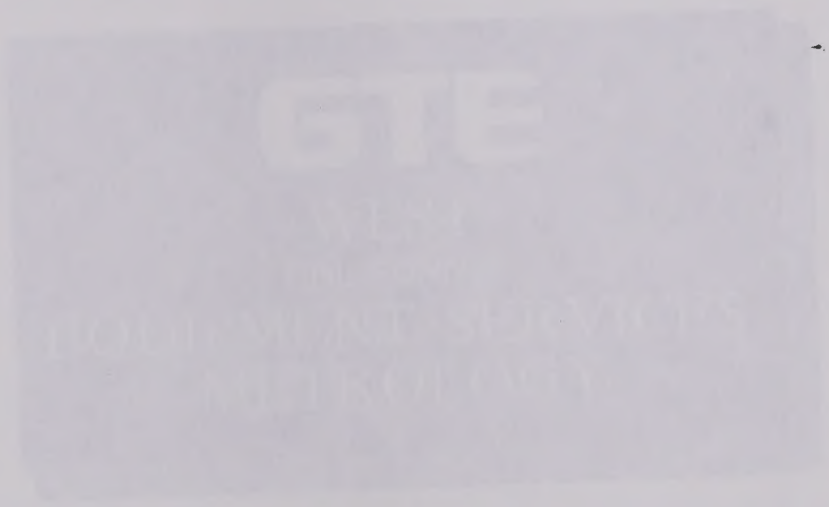
RELATED SPECIFICATIONS	CURRENT ISSUES & STATUS
EPC 900.009	1.0
EPC 900.009-EPS	N/A
EPC 900.009-TRS	N/A
EPC 900.009-RPS	N/A
EPC 900.009-XRF	N/A
EPC 900.009-PSS	N/A
EPC 900.000-CAL	1.0

METROLOGY CALIBRATION PROCEDURE

COMMUNICATIONS TECHNOLOGY

C9925/A

REPAIR TEST SET



EPC 900.009

METROLOGY CALIBRATION PROCEDURE

COMMUNICATIONS TECHNOLOGY

C9925/A

REPAIR TEST SET

Author

Author

Approved

EPC 900.009

Authors: Curt V. Casto and Javier Aceves

1.0 PREPARATORY INFORMATION

1.1 This document describes an approved method of calibration for the Communications Technology, C9925/A Repair Test Set, hereafter referred to as the Unit Under Test (UUT).

1.2 Unless otherwise specified on the Calibration Data Sheet/s it may be assumed that the standards used in the performance of this MCP meet or exceed a 4:1 tolerance uncertainty ratio with the UUT.

1.3 Throughout this procedure you will be instructed to "RECORD" data on the Calibration Data Sheets. If the customer does not require recorded data the instruction to"RECORD" data may be interpreted as requiring the technician to utilize the Calibration Data Sheet as a reference for UUT tolerances.

2.0 PRELIMINARY REQUIREMENTS

2.1 Refer to table 2-1 for a list of the standards recommended for use with this procedure. These are standards known to be available at the time of this writing. Any laboratory standard with the required accuracy ratio may be used in place of the standards listed.

Standard Requirements:	**Recommended Standards:**
DC and AC Voltage Calibrator: Range: 0 to 290 VDC (0 to 190 VAC) Accuracy: +/- .5% I.V.	**5100B** Fluke
Counter/ Timer Range: 300 to5050 Hz Accuracy: +/- 0.25% . I.V.	**1953A** Fluke
Level Meter:(Model listed is a 5 1/2 digit DMM) Range: -40 to +9 dBm (600 Ω) Accuracy: +/- 0.125 dB	**8840A** Fluke
Resistance Standard: Range: 10 Ω to 10 MΩ Accuracy: +/-(10 to 1 MΩ: .5%), (1M to 3 MΩ: .75%), (10M: 2.75%) I.V.	**1432 or DB 877** General Radio & ESI
Capacitance Standard: Range: 1.5 nfd to 1 μfd Accuracy: +/- 0.5%	**4440B** Hewlett Packard
Special Equipment of local stock/manufacturer:	
2 to 32 VDC Power Supply *(Accuracy: N/A)*	Local Stock
Oscilloscope {used for observation only} *(Accuracy: N/A)*	Local Stock
NOTE: *ACCURACIES LISTED ARE THOSE REQUIRED FOR A 4:1 T.U.R.*	

Table 2-1. Recommended Standards and Standards Requirements

3.0 EQUIPMENT SPECIFICATIONS

3.1 Table 3-1 lists the UUT's specifications.

3.2 Visual Inspection

3.2.1 Perform a visual inspection of the UUT for signs of physical damage that might create a hazardous condition in use.

3.3 Cleaning

3.3.1 Clean the UUT exterior with a soft cloth dampened in a mild solution of detergent and water. Do not attempt to clean the UUT interior.

NOTE: ALL UUT'S ARE CALIBRATED TO C9925A SPECIFICATIONS.

DC VOLTAGE:
Range: 0 to 300VDC
Accuracy: +/- (2% I.V. + .5V)

AC VOLTAGE:
Range: 0-250VAC
Accuracy: +/- (2% I.V. + .5V)

DC CURRENT:
Range: 0 to 200 mA
Accuracy: +/- (2% I.V. + .3mA)
+/- .3mA @ 20mA
Input Impeadance: 430 Ohms

RESISTANCE:
Range: 0 to 65 Mohms
Accuracy:
(0 to 200Ω) +/- (1% I.V. + 1 Ω)
(200 to 1MΩ) +/- (1% I.V + 1 Count)
(1M to 3.5MΩ) +/- (2% I.V. + 1 Count)
(3.5M to 65MΩ) +/- (10% I.V. + 1 Count)

CAPACITANCE:
Range: 300p to 5μF
Accuracy: +/- (2% I.V. + 50 pF)

LOSS:
Range: -40 to +10 dBm
Accuracy: +/- .5dB @1kHz (Freq.: +/- 5Hz)
Input Impeadance: 600 Ohms

METALLIC NOISE:
Range: 0 to 50dBmC
Accuracy: +/- 1 dB
Input Impeadance: 600 Ohms

POWER INFLUENCE
Range: 50 to 100dBmC
Accuracy: +/- .5 dB
Input Impeadance: > 100 kohms

DISTANCE:
Range: 20 to 20,000 feet
Accuracy: +/- (2% I.V. + 6 ft.)

SEND TONE AND VARIABLE FREQ SEND
Send Freq (404, 1004, 2713, 2804, 3000, and 5000 Hz @ 0 dBm)
Tone:
Range: 300 to 5000 Hz
Accuracy: +/- 1% I.V.
Level:
Range: -24 to +5 dBm
Accuracy: +/- .5 dB

Table 3-1. UUT specifications. *(refer to the Manufacturer's manual for complete specifications.)*

4.0 CALIBRATION

NOTE: Throughout this procedure you will be given programming instructions for both the C9925 and C9925A models. If seperate instructions are not provided, both instruments share the same programming sequence. All program sequences will start at the Main (Power-up) menu. Pressing the UUT START button reatedly will return you to main menu. The following is a typical programming sequence and brief explanation:

5, ENTER, 2, ENTER (2 Terminal Meter, Ohms)

To perform this program sequence (from the main menu [press START as necessary]): Press the 5 key followed by the ENTER key to select the 2 Terminal Meter Menu. Then Press the 2 key followed by the ENTER key to select the Ohms Function. This completes the programming sequence. The text in parenthesis, following the programming sequence, is a text reference only.

NOTE: If no key is pressed, the UUT will generate a tone (the quintessential obnoxious noise) after 45 seconds. After an additional 15 seconds the UUT will shut itself off if no key is pressed.

4.1 SELF TESTS

4.1.1 Turn the UUT on by pressing the Start Button.

.2 Perform the following programming sequence:

1, ENTER (Self Tests)

.3 If the battery type displayed (Nicad or Alkaline) does not reflect the type installed, press the ⇑ key to select the correct type.

.4 Ensure that the battery voltage does not indicate low (6.2 VDC for Nicad and 6.8 VDC for Alkaline). If the batteries are low recharge/replace them prior to performing this procedure.

.5 Press the UUT START key and follow the instructions displayed.

.6 Record PASS on the Calibration Data Sheet if upon completion of Self Tests, the UUT displays: "*SELF TEST: PASSED 3T TEST*".

4.2 DC VOLTAGE TESTS

4.2.1 Connect the Equipment as shown in Figure 4-1.

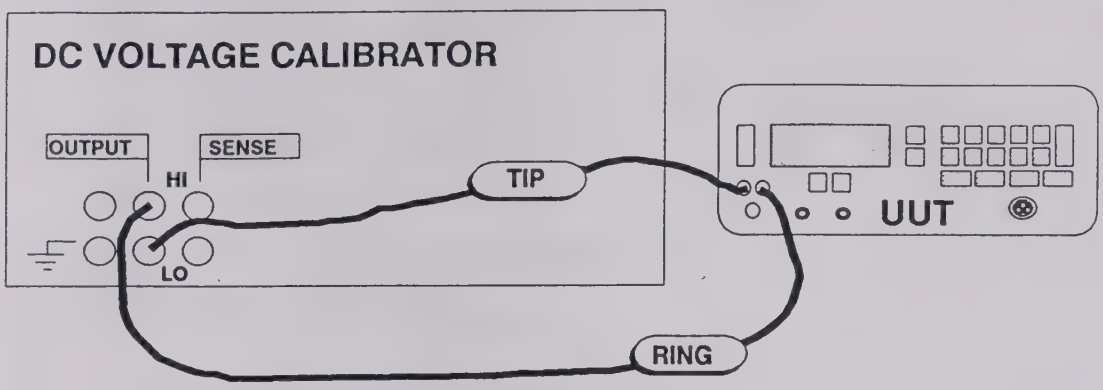


Figure 4-2. DC Voltage Tests

4.2.2 Perform the following programming sequence:

5, ENTER, 1, ENTER, (2 Terminal Meter, Volts [DC is default])

.3 Program the DC Voltage Calibrator to output 10 VDC.

.4 Record the UUT indication on the Calibration Data Sheet.

.5 Use the method described in steps 4.2.3 and 4.2.4 for each DC Voltage value listed on the Calibration Data Sheet.

4.3 AC VOLTAGE TESTS

4.3.1 Connect the equipment as shown in Figure 4-2.

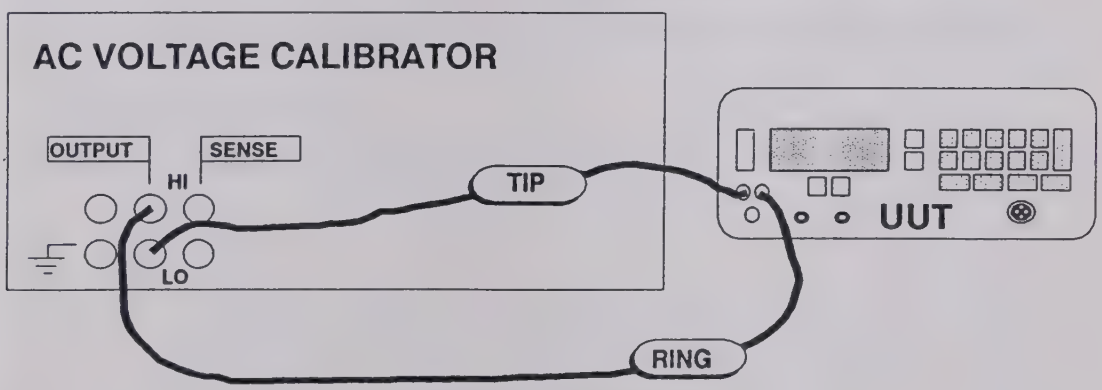


Figure 4-2. AC Voltage Tests

4.3.2 Perform the following programming sequence:

5, ENTER, 1, ENTER, ⇓ (2 Terminal Meter, Volts, VRMS)3

4.3.3 Program the AC Voltage Calibrator to output 10 V @100 Hz.

.4 Record the UUT indication on the Calibration Data Sheet.

.5 Use the method described in steps 4.3.3 and 4.3.4 for each Voltage and Frequency value listed on the Calibration Data Sheet

4.4 RESISTANCE TESTS

4.4.1 Connect the equipment as shown in figure 4-3.

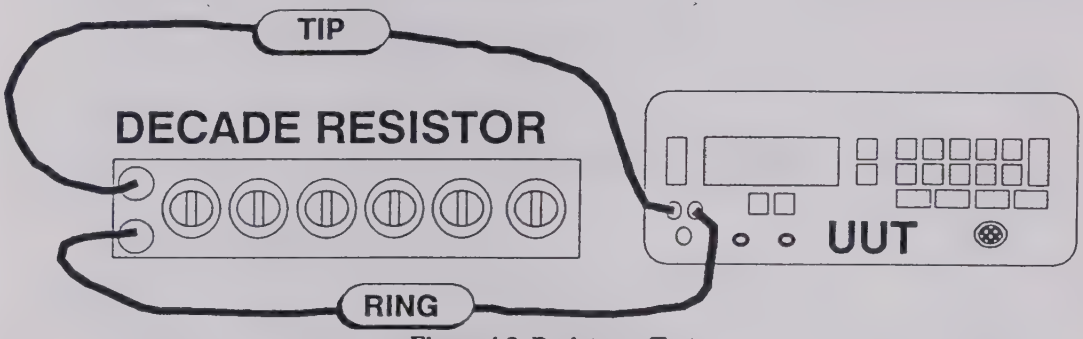


Figure 4-3. Resistance Tests

4.4.2 Perform the following programming sequence:

5, ENTER, 2, ENTER, (2 Terminal Meter, Ohms)

.3 Set the Decade Resistor to 10 Ω.

.4 Record the UUT indication on the Calibration Data Sheet.

.5 Use the method described in steps 4.4.3 and 4.4.4 for each Resistance value listed on the Calibration Data Sheet.

4.5 CAPACITANCE TESTS

4.5.1 Connect the equipment as shown in figure 4-4.

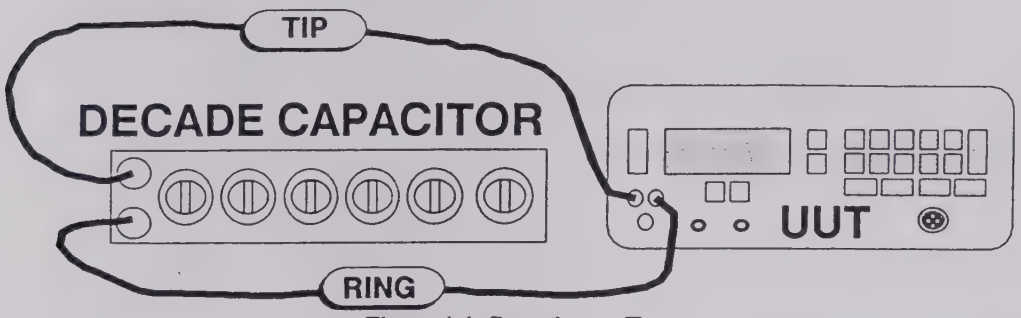


Figure 4-4. Capacitance Tests

4.5.2 Perform the following programming sequence:

5, ENTER, 3, ENTER, (2 Terminal Meter, Capacitance)

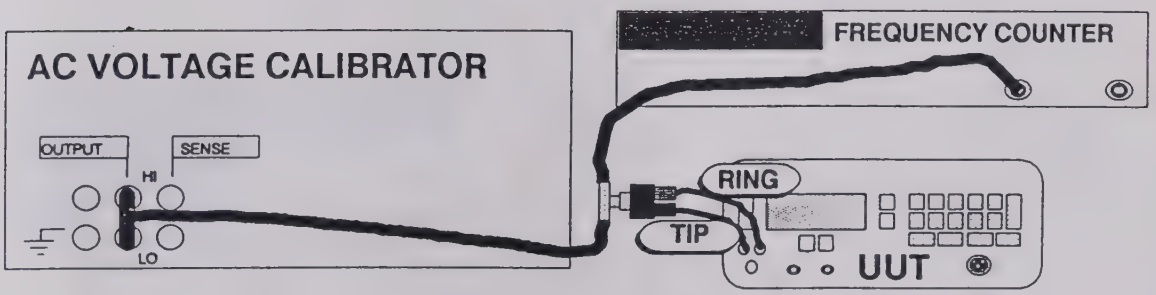
.3 Set the Decade Capacitor to 1.5 nF.

.4 Record the UUT indication on the Calibration Data Sheet.

.5 Use the method described in steps 4.5.3 and 4.5.4 for each Capacitance value listed on the Calibration Data Sheet.

4.6 dBm/Hz TESTS

4.6.1 Connect the equipment as shown in figure 4-5.



NOTE: If the AC Voltage Calibrator is a Fluke 5700A or other AC Signal Source with a 0.25% or better frequency accuracy, the Frequency Counter is not needed and the calibrator's frequency setting may be recorded as the NOMINAL VALUE in the following steps when instructed to record the Frequency Counter's indication.

Figure 4-5. dBm/Hz Tests

4.6.2 Perform the following programming sequence:

C9925: **5, ENTER, 4, ENTER,** (2 Terminal Meter, dBm/Hz)
C9925A: **5, ENTER, 4, ENTER,** (2 Terminal Meter, Level/Freq)

.3 Configure the Frequency Counter to measure the selected frequency with 1 Hz resolution (typically a 1 second gate period).

.4 Program the AC Voltage Calibrator to output +9 dBm @ 1 kHz.

.5 Record the UUT indication on the Calibration Data Sheet.

.6 Use the method described in steps 4.6.4 and 4.6.5 for each Level listed on the Calibration Data Sheet.

.7 Program the AC Voltage Calibrator to output 100 Hz @ 0 dBm.

.8 Record the Frequency Counter's Indication as the NOMINAL VALUE on the Calibration Data Sheet.

.9 Record the UUT indication on the Calibration Data Sheet.

.10 Use the method described in steps 4.6.7 through 4.6.9 for each frequency listed on the Calibration Data Sheet.

4.7 DC CURRENT TESTS

4.7.1 Connect the equipment as shown in Figure 4-6.

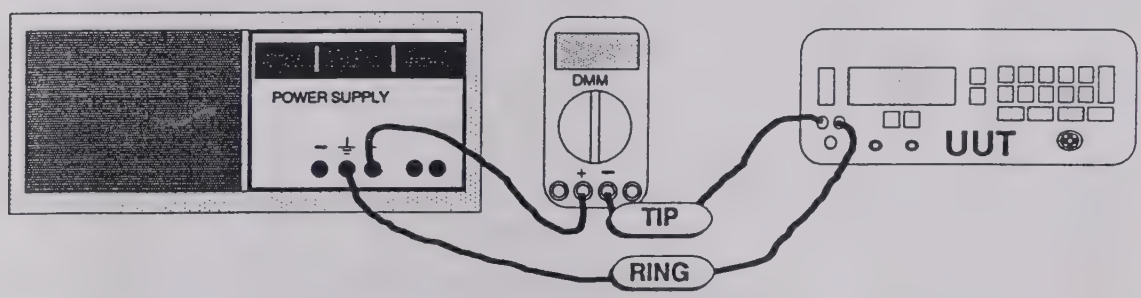


Figure 4-6. DC Current Tests

NOTE: Due to the UUT's current measurement technique, it will be necessary to use the DMM's mA display indication as the nominal value. The UUT uses an internal 430 Ω current shunt that is only in circuit during the UUT's measurement integration period. It will be necessary to observe the DMM display during the UUT's integration period to obtain the nominal value. UUT Tolerances listed on the Calibration Data Sheet are relative to the nominal (DMM) value.

4.7.2 Perform the following programming sequence:

C9925: **3, ENTER, 1, ENTER,** (Transmission Tests, Current)
C9925A: **3, ENTER, 1, ENTER,** (Transmission Tests, Current/GND Ohms)

NOTE: Only one measurement cycle will occur each time the programming sequence is performed. Press **START, 1, ENTER** to initiate a new mesurement cycle.

.3 Configure the DMM as necessary to measure DC Current between 4mA and 80mA.

.4 Set the Power Supply to output approximately 2 VDC.

.5 Observe the DMM during the UUT's integration period and record the DMM indication as the **NOMINAL VALUE** on the Calibration Data Sheet.

.6 Upon completion of the UUT's Integration Period, Record the UUT indication on the Calibration Data Sheet as the **AS RECEIVED/RETURNED VALUE.**

.7 Use the method described in steps 4.7.4 through 4.7.6 for each DC Current value listed on the Calibration Data Sheet.

4.8 NOISE TEST

4.8.1 Connect the equipment as shown in Figure 4-7.

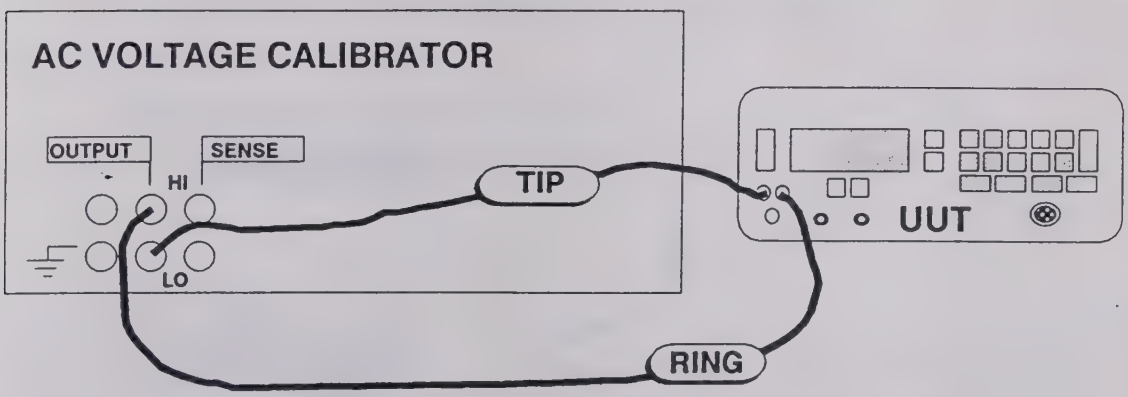


Figure 4-7. Noise Tests

4.8.2 Perform the following programming sequence:

3, ENTER, 2, ENTER, ⇓, 1, ENTER (Transmission Tests, Noise, Overriide, Yes)

.3 Program the AC Voltage Calibrator to output -50 dBm @ 1 kHz (2.450 mV/600 Ω).

.4 Record the UUT's *"CKT:"* indication on the Calibration Data Sheet.

4.9 POWER INFLUENCE TEST

4.9.1 Connect the equipment as shown in Figure 4-8.

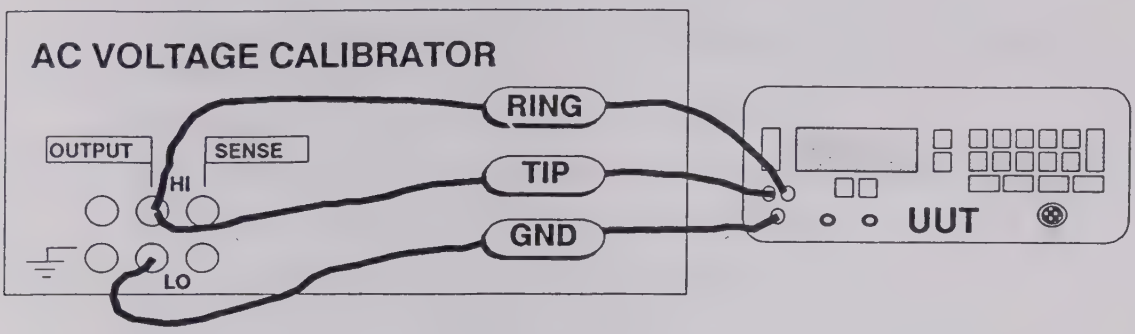


Figure 4-8. Power Infuence Test

4.9.2 Perform the following programming sequence:

3, ENTER, 2, ENTER, ⇓, 1, ENTER (Transmission Tests, Noise, Overriide, Yes)

.3 Program the AC Voltage Calibrator to output 0 dBm @ 1 kHz (.7746 V/600 Ω).

.4 Record the UUT's *"PWR:"* indication on the Calibration Data Sheet.

4.10 SEND FREQUENCY TESTS

Connect the equipment as shown in figure 4-9.

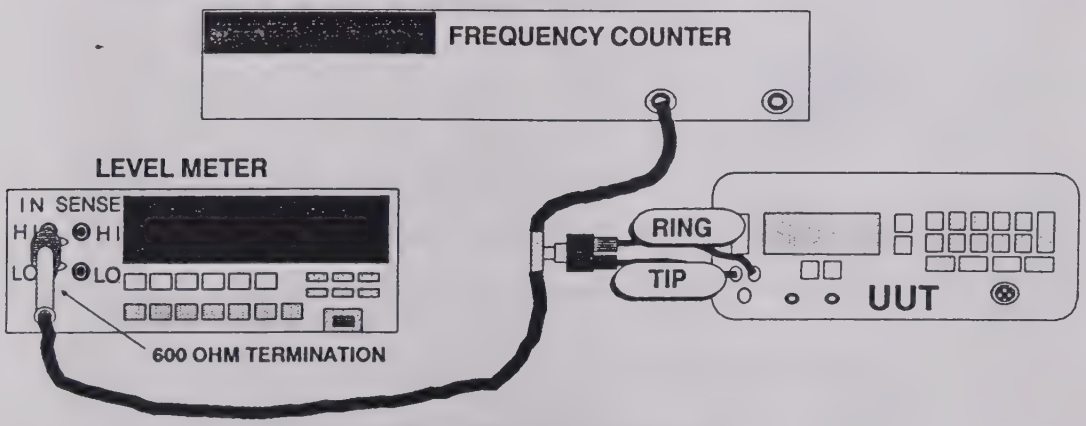


Figure 4-9. Send Frequency Tests

4.10.2 Perform the following programming sequence:

3, ENTER, 7, ENTER, 1, ENTER (Transmission Tests, Send Freq., 404 Hz)

.3 Configure the Frequency Counter to measure the selected frequency with 1 Hz resolution (typically a 1 second gate period).

.4 Configure the Level Meter to measure 0 dBm (.7746 V/600 Ω).

.5 Record The Frequency Counter's Indication on the Calibration Data Sheet.

.6 Record the Level Meter's indication on the Calibration Data Sheet.

.7 Press the UUT START key to go back to the frequency selection menu.

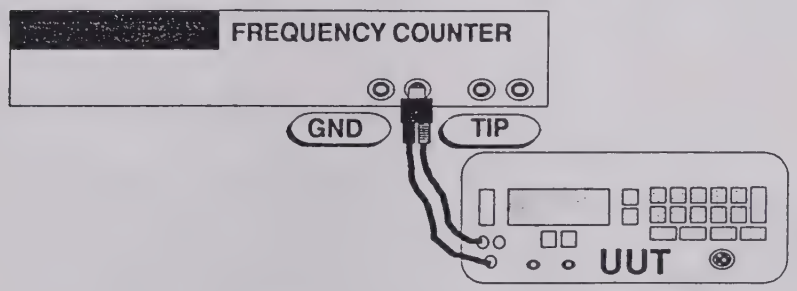
.8 Select the next frequency listed on the Calibration Data Sheet.

.9 Use the method described in steps 4.10.5 through 4.10.8 for each frequency listed on the Calibration Data Sheet.

4.11 SEND TONE TESTS

4.11.1 Connect the equipment as shown in figure 4-10.

Figure 4-10. Send Tone Tests (Continuous)



4.11.2 Perform the following programming sequence:

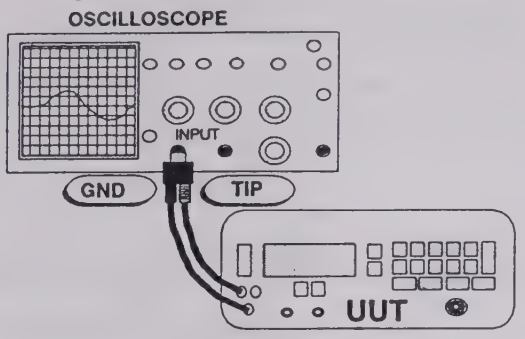
7, ENTER, 1, ENTER, 2, ENTER, ⇑ (Utilities, Send Tone, Tip to Gnd, Constant)

.3 Configure the Frequency Counter to measure the selected frequency with 1 Hz resolution (typically a 1 second gate period).

.4 Record The Frequency Counter's Indication on the Calibration Data Sheet.

.5 Connect the equipment as shown in figure 4-11.

Figure 4-11. Send Tone Tests (Alternating)



4.11.6 Perform the following programming sequence:

7, ENTER, 1, ENTER, 2, ENTER, ⇓ (Utilities, Send Tone, Tip to Gnd, Alternating)

.3 Configure the Oscilloscope as necessary to view several UUT sine wave cycles.

.4 Record PASS on the Calibration Data Sheet if the UUT 577.5 Hz output alternately switches from on to off.

4.12 DISTANCE TESTS

Connect the equiment as shown in figure 4-12.

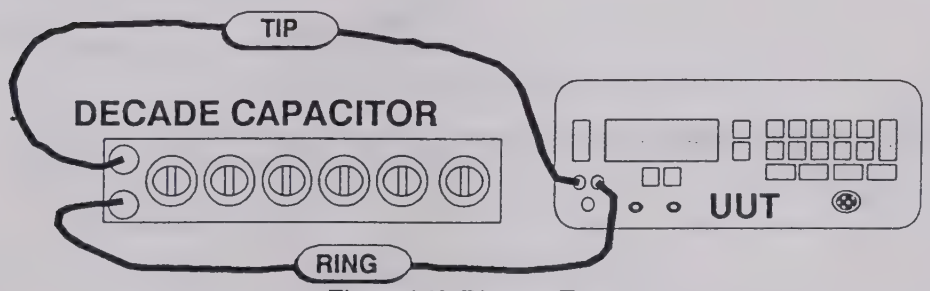


Figure 4-12. Distance Tests

4.12.2 Set the Decade Capacitor to 30 nF.

4.3 Perform the following programming sequence:

4, ENTER, 3, ENTER, ⇒ (Manual Tests, Distance, 3T Cap:)

NOTE: Only one measurement cycle will occur each time the programming sequence is performed. Press **START, 3, ENTER, ⇒**to initiate a new mesurement cycle.

.4 Record the UUT's *"TR:"* indication on the Calibration Data Sheet.

.5 Remove the UUT RING lead from the Decade Capacitor and replace it with the GND lead.

4.12.6 Record the UUT's *"TG:"* indication on the Calibration Data Sheet.

.7 Remove the UUT TIP lead from the Decade Capacitor and replace it with the RING lead.

.8 Record the UUT's *"RG:"* indication on the Calibration Data Sheet.

4.13 VARIABLE SEND FREQUENCY TESTS

NOTE: Some UUT's may not have this option. If the UUT does not have this option, record "N/A" on the Calibration Data Sheet's AS RECEIVED column and skip this section.

4.13.1 Connect the Equipment as shown in figure 4-13.

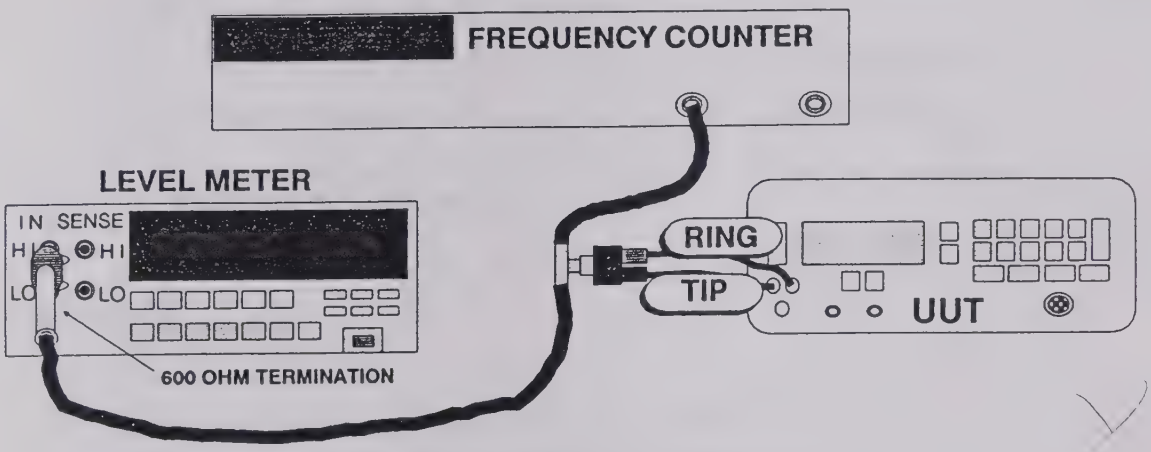


Figure 4-13. Variable Send Frequency Tests

NOTE: **Throughout this section, you will be instructed set UUT Variable Frequencies. Use the following information for UUT programming:**

A. Setting Frequency:

1. From the UUT "Select Freq." menu, select "Variable".
2. Use the UUT ⇐(-.1 kHz), ⇒(+.1 kHz), ⇑(+1 kHz), and ⇓(-1 kHz) keys to select the desired frequency.
3. Press ENTER to complete frequency selection.

B. Setting Amplitude:

1. After the ENTER key was pressed in step A3 the Amplitude Selection Function was automaticlly selected.
2. Use the UUT ⇑(+1 dBm) and ⇓(-1 dBm) keys to select the desired amplitude.
3. Press ENTER to complete amplitude selection and begin transmitting.

4.13.2 Perform the following programming sequence:

3, ENTER, 7, ENTER, 7, ENTER , {Select 300 Hz and 0 dBm}
(Transmission Tests, Send Freq., Variable, 300 Hz, 0 dBm)

.3 Configure the Frequency Counter to measure the selected frequency with 1 Hz resolution (typically a 1 second gate period).

.4 Configure the Level Meter to measure 0 dBm (.7746 V/600 Ω).

.5 Record The Frequency Counter's Indication on the Calibration Data Sheet.

.6 Record the Level Meter's indication on the Calibration Data Sheet.

.7 Press the UUT START key to go back to the Variable Frequency Selection Mode.

.8 Select the next frequency and amplitude listed on the Calibration Data Sheet.

.9 Use the method described in steps 4.13.5 through 4.13.8 for each frequency and amplitude listed on the Calibration Data Sheet.

.10 Disconnect the equipment.

5.0 Labels

5.1 CALIBRATION LABELS

5.1.1 Observing the correct dates, affix the appropriate label to the UUT.

5.2 CALIBRATION VOID LABELS

5.2.1 Affix the "Calibration Void if Seal is Broken" label/s in a manner that will prevent access to the inner UUT or calibration adjustments. Do not cover areas that are designed for user accessibility, such as battery compartments.

6.0 References

6.1 Communications Technology, Operators Manual, C9925 Series, Part No. 1842402 (manual).

6.2 ESC Metrology, Quality Assurance Manual.

SERIAL #:_____ BAR CODE:_____

CALIBRATION DATA SHEET
COMM. TECHNOLOGY C9925/A

STAMP #:_____ REPORT #:_____

MCP STEP NO.	FUNCTION TESTED	NOMINAL VALUE	AS RECEIVED VALUE	AS RETURNED VALUE	OUT OF TOL.	TOLERANCE BAND
4.1.6	SELF TESTS	PASS				PASS/FAIL
4.2	DC VOLTAGE TESTS					
4.2.4	10 VDC	10.0 VDC				9.3 to 10.7 VDC
4.2.5	100 VDC	100.0 VDC				97.5 to 102.5 VDC
↓	200 VDC	200.0 VDC				195.5 to 204.5 VDC
↓	290 VDC	290.0 VDC				283.7 to 296.3 VDC
↓	-10 VDC	-10.0 VDC				-9.7 to -10.3 VDC
4.3	AC VOLTAGE TESTS					
4.3.4	10 V @ 100 Hz	10.0 VAC				9.3 to 10.7 VAC
4.3.5	100 V @ 50 Hz	100.0 VAC				97.5 to 102.5 VAC
↓	150 V @ 200 Hz	150.0 VAC				146.5 to 153.5 VAC
↓	190 V @ 50 Hz	190.0 VAC				185.7 to 194.3 VAC
4.4	RESISTANCE TESTS					
4.4.4	10 OHMS	10.0				8.9 to 11.1 OHMS
4.4.5	100 OHMS	100.0				98.0 to 102.0 OHMS
↓	1 KOHMS	1.0 K				890 to 1.1k OHMS
↓	10 KOHMS	10.0 K				9.8k to 10.2k OHMS
↓	100 KOHMS	100.0 K				98.9k to 101.1k OHMS

COMMENTS:

SERIAL #:_____ BAR CODE:_____

CALIBRATION DATA SHEET
COMM. TECHNOLOGY C9925/A

STAMP #:_____ REPORT #:_____

MCP STEP NO.	FUNCTION TESTED	NOMINAL VALUE	AS RECEIVED VALUE	AS RETURNED VALUE	OUT OF TOL.	TOLERANCE BAND
4.4 CONTINUED	RESISTANCE TESTS					
4.4.5	900 KOHMS	900.0 K				890.9k to 909.1k OHMS
↓	1.2 MOHMS	1.2 M				1.1M to 1.3M OHMS
↓	3 MOHMS	3.0M				2.8M to 3.2M OHMS
↓	10 MOHMS	10.0 M				8.9M to 11.1M OHMS
4.5	CAPACITANCE TESTS					
4.5.4	1.5 nF	1.50 nF				1.42n to 1.58n F
4.5.5	10 nF	10.00 nF				9.75n to 10.25n F
↓	90 nF	90.00 nF				88.15n to 91.85n F
↓	1 uF	1.00 uF				0.98u to 1.02u F
4.6	dBm/Hz TESTS					
4.6.5	+9 dBm @ 1 kHz	9.0 dBm				8.5 to 9.5 dB
4.6.6	0 dBm @1 KHz	0.0 dBm				-0.5 to +0.5 dB
↓	-20 dBm @ 1 KHz	-20.0dBm				-19.5 to -20.5 dB
↓	-40 dBm @ 1 kHz	-40.0 dBm				-39.5 to -40.5 dB
4.6.9	100 Hz @ 0 dBm	(Freq. Counter Indication)				+/- 2 Hz
4.6.10	400 Hz @ 0 dBm	(Freq. Counter Indication)				+/- 5 Hz
↓	1 KHz @ 0 DbM	(Freq. Counter Indication)				+/- 11 Hz
↓	9 KHz @ 0 dBm	(Freq. Counter Indication)				+/- 91 Hz
4.7	DC CURRENT TESTS					
4.7.6	App. 5 mA DC (2 VDC/LOAD)	(DMM INDICATION)				+/- 0.4 mA
4.7.7	App. 20 mA DC (8.6 VDC/LOAD)	(DMM INDICATION)				+/- 0.7 mA

COMMENTS:

SERIAL #:_____ BAR CODE:_____

CALIBRATION DATA SHEET
COMM. TECHNOLOGY C9925/A

STAMP #:_____ REPORT #:_____

MCP STEP NO.	FUNCTION TESTED	NOMINAL VALUE	AS RECEIVED VALUE	AS RETURNED VALUE	OUT OF TOL.	TOLERANCE BAND
4.7 CONTINUED	DC CURRENT TESTS					
4.7.7	App. 75 mA DC (32 VDC/LOAD)	(DMM INDICATION)				+/- 1.8 mA
4.8	NOISE TEST					
4.8.4	-50 dBm @ 1KHz (2.450m V into 600 OHMS)	40.0 U				39.0 to 41.0 U
4.9	PWR INFLUENCE TESTS					
4.9.4	0 dBm @ 1KHz	90.0 M				89.5 to 90.5 M
4.10	SEND FREQ. TESTS					
4.10.5	404 Hz @ 0 dBm	404 Hz				400 to 408 Hz
4.10.6	0 dBm @ 404 Hz	0.0 dBm				-0.5 to +0.5 dBm .73127 to .82049 VAC
4.10.9	1004 Hz @ 0dBm	1004 Hz				994 to 1014 Hz
	0 dBm @ 1004 Hz	0.0 dBm				-0.5 to +0.5 dBm .73127 to .82049 VAC
	2713 Hz @ 0 dBm	2713 Hz				2686 to 2740 Hz
	0 dBm @ 2713 Hz	0.0 dBm				-0.5 to +0.5 dBm .73127 to .82049 VAC
	2804 Hz @ 0 dBm	2804 Hz				2776 to 2832 Hz
	0 dBm @ 2804 Hz	0.0 dBm				-0.5 to +0.5 dBm .73127 to .82049 VAC
	3000 Hz @ 0 dBm	3000 Hz				2970 to 3030 Hz
	0 dBm @ 3000 Hz	0.0 dBm				-0.5 to +0.5 dBm .73127 to .82049 VAC
	5000 Hz @ 0 dBm	5000 Hz				4950 to 5050 Hz

COMMENTS:

SERIAL #: _____ BAR CODE: _____

CALIBRATION DATA SHEET
COMM. TECHNOLOGY C9925/A

STAMP #: _____ REPORT #: _____

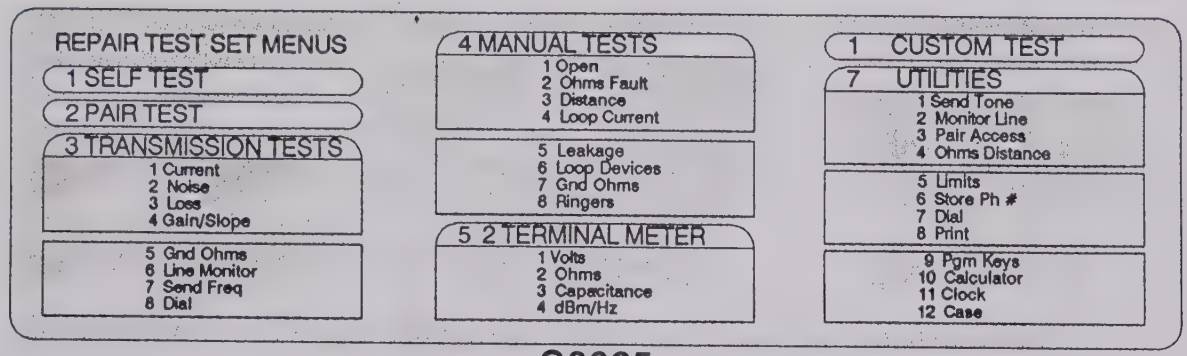
MCP STEP NO.	FUNCTION TESTED	NOMINAL VALUE	AS RECEIVED VALUE	AS RETURNED VALUE	OUT OF TOL	TOLERANCE BAND
4.10 CONTINUED	SEND FREQ. TESTS					
4.10.9	0 dBm @ 5000 Hz	0.0 dBm				-0.5 to +0.5 dB .73127 to .82049 VAC
4.11	SEND TONE TESTS					
4.11.4	577 Hz CONTINUOUS	577.0 Hz				571 to 583 Hz
4.11.4	577 Hz ALTERNATING	PASS				PASS/FAIL
4.12	DISTANCE TESTS					
4.12.4	TIP to RING @ 30 nF	30.00 nF				29.40 to 30.60 nF
4.12.6	TIP to GND @ 30 nF	30.00 nF				29.40 to 30.60 nF
4.12.8	RING to GND @ 30 nF	30.00 nF				29.40 to 30.60 nF
4.13 *	VARIABLE SEND FREQ. TESTS					
4.13.5	300 Hz 0 dBM	300.0 Hz	N/A	N/A	—	297 to 303 Hz
4.13.6	0 dBm @ 300 Hz	0.0 dBm	N/A	N/A	—	-0.5 to +0.5 dB .73127 to .82049 VAC
4.13.9	5 KHz @ 0 dBM	5000.0 Hz	N/A	N/A	—	4950 to 5050 Hz
	0 dBm @ 5 KHz	0.0 dBm	N/A	N/A	—	-0.5 to +0.5 dB .73127 to .82049 VAC
	1 KHz @ 0 dBm	1000.0 Hz	N/A	N/A	—	990 to 1010 Hz
	0 dBm @ 1 KHz	0.0 dBm	N/A	N/A	—	-0.5 to +0.5 dB .73127 to .82049 VAC
	+5 dBm @ 1 KHz	+5.0 dBM	N/A	N/A	—	+4.5 to +5.5 dB 1.3004 to 1.4591 VAC
	-10 dBm @ 1 KHz	-10.0 dBM	N/A	N/A	—	-9.5 to -10.5 dB .23125 to .25946 VAC

* LINE

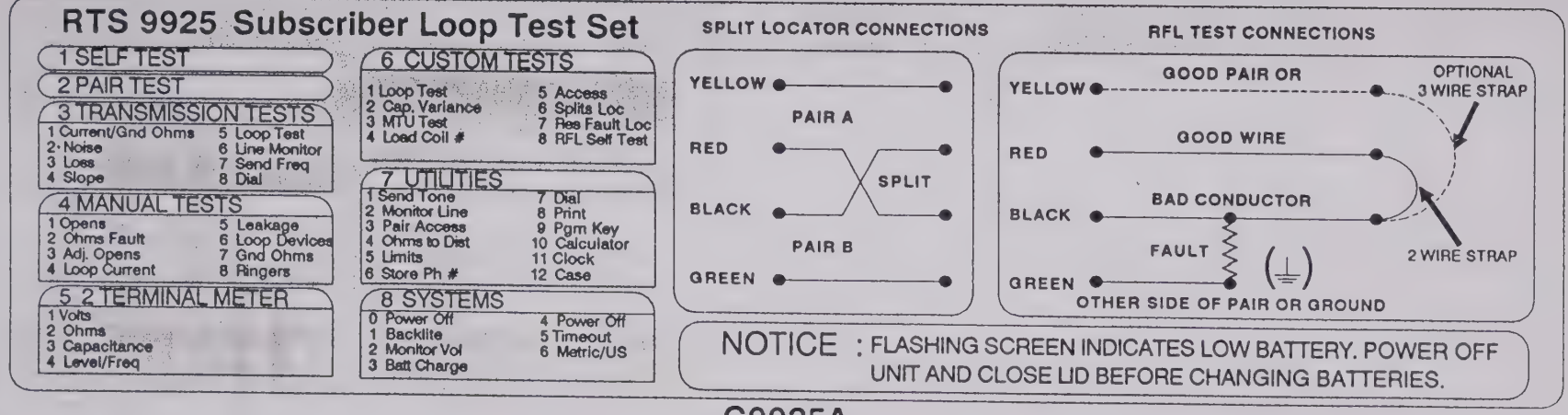
COMMENTS: * This Function is not available on all UUT's. N/A in the AS RECEIVED column indicates that this option is not installed.

11/26/93 LINES 1 – 8 completed

C9925 KEYBOARD TEMPLATES



C9925



C9925A

NOTE: These templates may not be accurate for all versions of C9925 Firmware (EPROM) and should only be used in the absence of the template furnished by the manufacturer.

SPECIFICATION TITTLE

METROLOGY CALIBRATION PROCEDURE FOR THE

EQUIPMENT SERVICES CENTER

METROLOGY DEPARTMENT

PRODUCTION ENGINEERING - ESC		
Prepared by ED Izworski		Date 1-10-92
Approved by Equipment Services Superintendetedent		Date
Approved by Equipment Services Manager		Date
Issue	Spec. No. [redacted] MCP0021	Sh. 01 of

ISSUE STATUS SPECIFICATION

EPC 900.

RELATED SPECIFICATIONS	CURRENT ISSUES & STATUS
EPC 900.	
EPC 900. -EPS	N/A
EPC 900. -TRS	N/A
EPC 900. -RPS	N/A
EPC 900. -XRF	N/A
EPC 900. -PSS	N/A
EPC 900.000-CAL	

METROLOGY CALIBRATION PROCEDURE

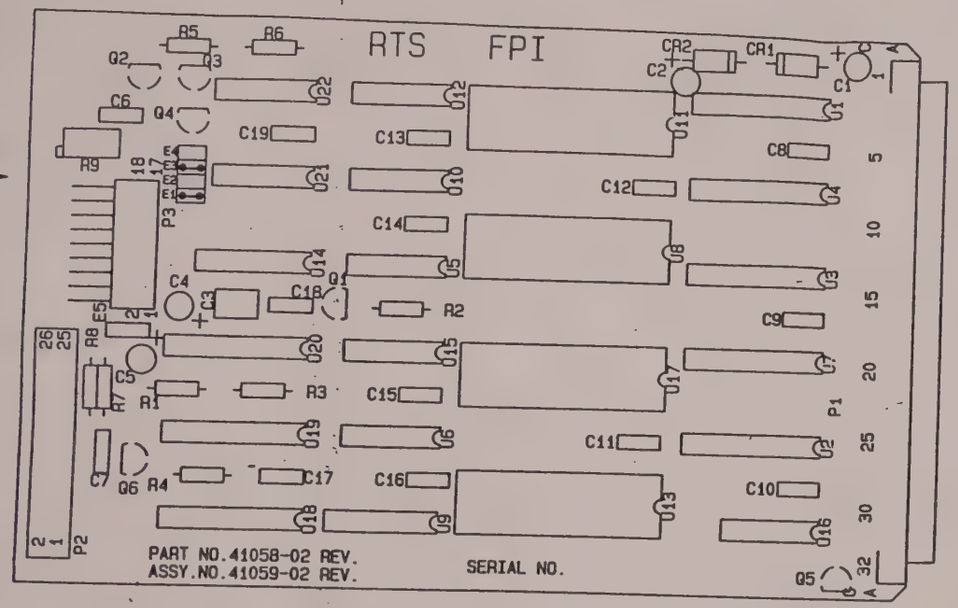
Ed Iwaski
Prepared by

Technically Validated by

Approved by

IMPORTANT - PLEASE READ
THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND TRADE SECRETS OF COMMUNICATIONS TECHNOLOGY CORPORATION AND OF OTHERS. ALL RIGHTS RESERVED. THIS DRAWING IS SUBMITTED FOR A SPECIFIC PURPOSE AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, WITHOUT THE PRIOR WRITTEN PERMISSION OF COMMUNICATIONS TECHNOLOGY CORPORATION.

REVISION BLOCK				
LET	REVISION	BY	DATE	CHK
N/C	INITIAL RELEASE EN 8409	E.B.	4-2-87	
A	REVISED EN 8467	E.B.	5-1-87	
B	REVISED-EN847G	SF	5/20/87	
C	REV. PER ECN D1560	P.O.	11/17/87	



QTY. REQ'D.	ITEM NO.	PART NUMBER	DESCRIPTION	REF. DES.
	30			
1	29	46533-01	TRANSISTOR VP0300M	Q6
5	28	46531-01	TRANSISTOR VN2222L	Q1-5
1	27	45924-01	POTENTIOMETER 50K	R9
1	26	45184-01	RESISTOR CF 5% 1/4W 4.7K	R3
1	25	45158-01	RESISTOR CF 5% 1/4W 100K	R2
2	24	45000-13	RESISTOR CF 5% 1/4W 100 Ohm	R1, 4
2	23	45000-02	RESISTOR CF 5% 1/4W 10K	R6, 7
2	22	45000-01	RESISTOR CF 5% 1/4W 1K	R5, 8
1	21	44202-01	IC 74HC11	U16
1	20	44201-01	IC 74HC4075	U6
1	19	44200-01	IC 74C923	U20
1	18	44199-01	IC 74HC164	U21
1	17	44198-01	IC 74HC688	U7
2	16	44097-01	IC 74HC139	U9, 14
1	15	44096-01	IC 74HC00	U5
1	14	44088-01	IC 74HC02	U15
6	13	44084-01	IC 74HC245	U1-4, 18, 19
1	12	44031-01	IC 74HC32	U10
2	11	44079-01	IC 74HC74	U12, 22
2	10	42019-01	DIODE 1N5817	CR1, 2
4	9	41713-01	IC SOCKET 28 PIN	U8, 11, 13, 17
1	8	41654-01	CONNECTOR 18 PIN	P3
1	7	41537-01	CONNECTOR 64 PIN	P1
1	6	40636-01	CAPACITOR POLYESTER .33uF	C3
1	5	40587-01	CAPACITOR TANTALUM 10uF	C1
3	4	40585-01	CAPACITOR TANTALUM 4.7uF	C2, 4, 5
14	3	40580-01	CAPACITOR POLYESTER .1uF	C6-19
1	2	54451-01	CABLE ASSEMBLY	P2
1	1	41058-02	PRINTED CIRCUIT BOARD	

CAUTION:
ANTI-STATIC HANDLING REQUIRED

1. MAX. LEAD TRIM LENGTH .050.
2. ADD JUMPER AT E1 & E3.
UNLESS OTHERWISE SPECIFIED

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± 1 | DECIMALS .XX ± 1, .XXX ± | ANGLES ±

DRAWN	E.BEITZERMAN	3/26/87
CHECKED		4-2-87
APPROVED		4-6-87
APPROVED		11/17/87

DO NOT SCALE DRAWING

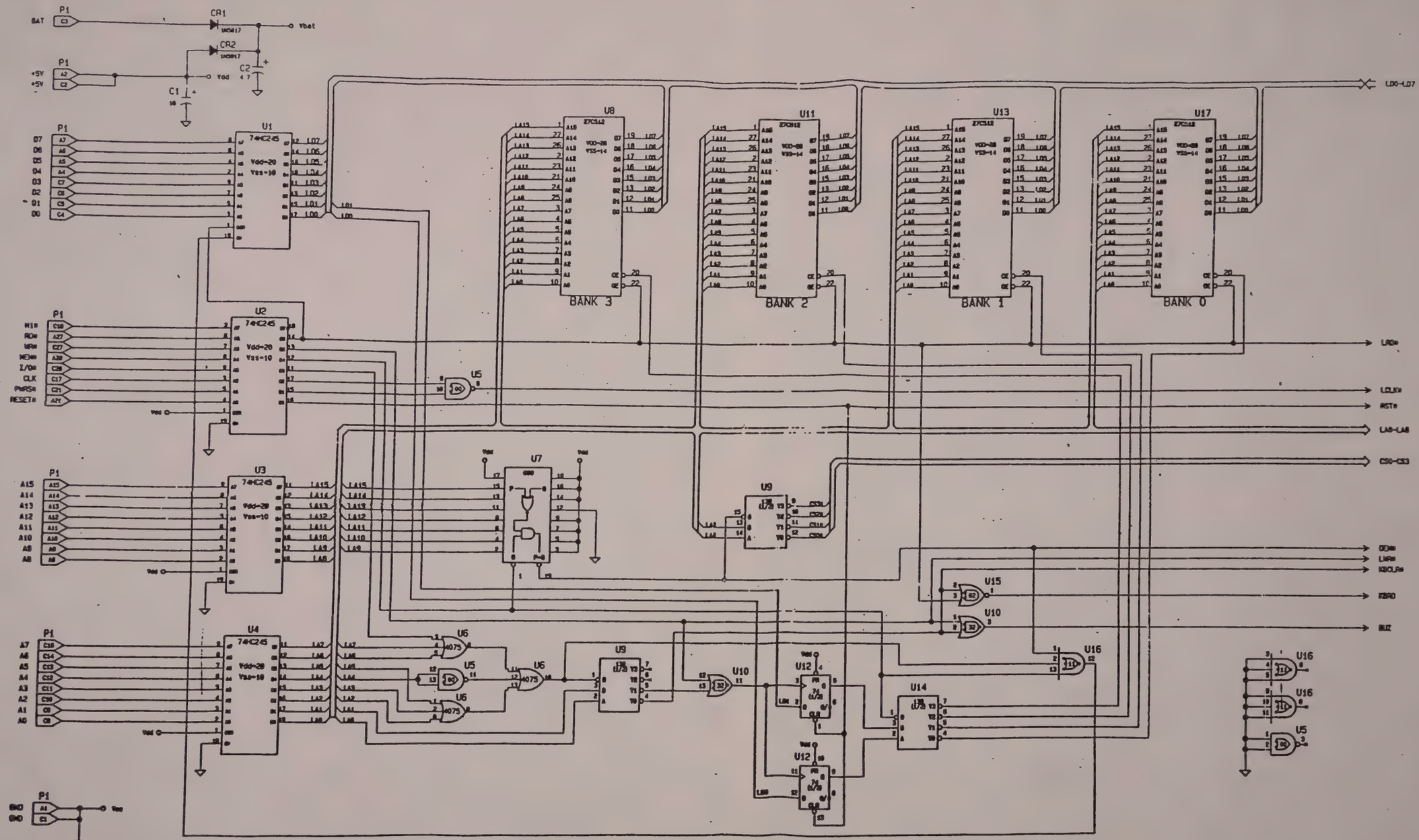
COMMUNICATIONS TECHNOLOGY

RTS FPI BOARD SUB ASSEMBLY DRAWING

UNLESS OTHERWISE SPECIFIED REMOVE BURRS AND BREAK SHARP EDGES

SCALE 2/1 | SIZE D | DASH NO. | REV

LET	REVISION	BY	DATE	CHK
N/C	INITIAL RELEASE ON 8409	E B.	6.2.87	R F
A	REVISED -SN8773	J J.	11.10.87	

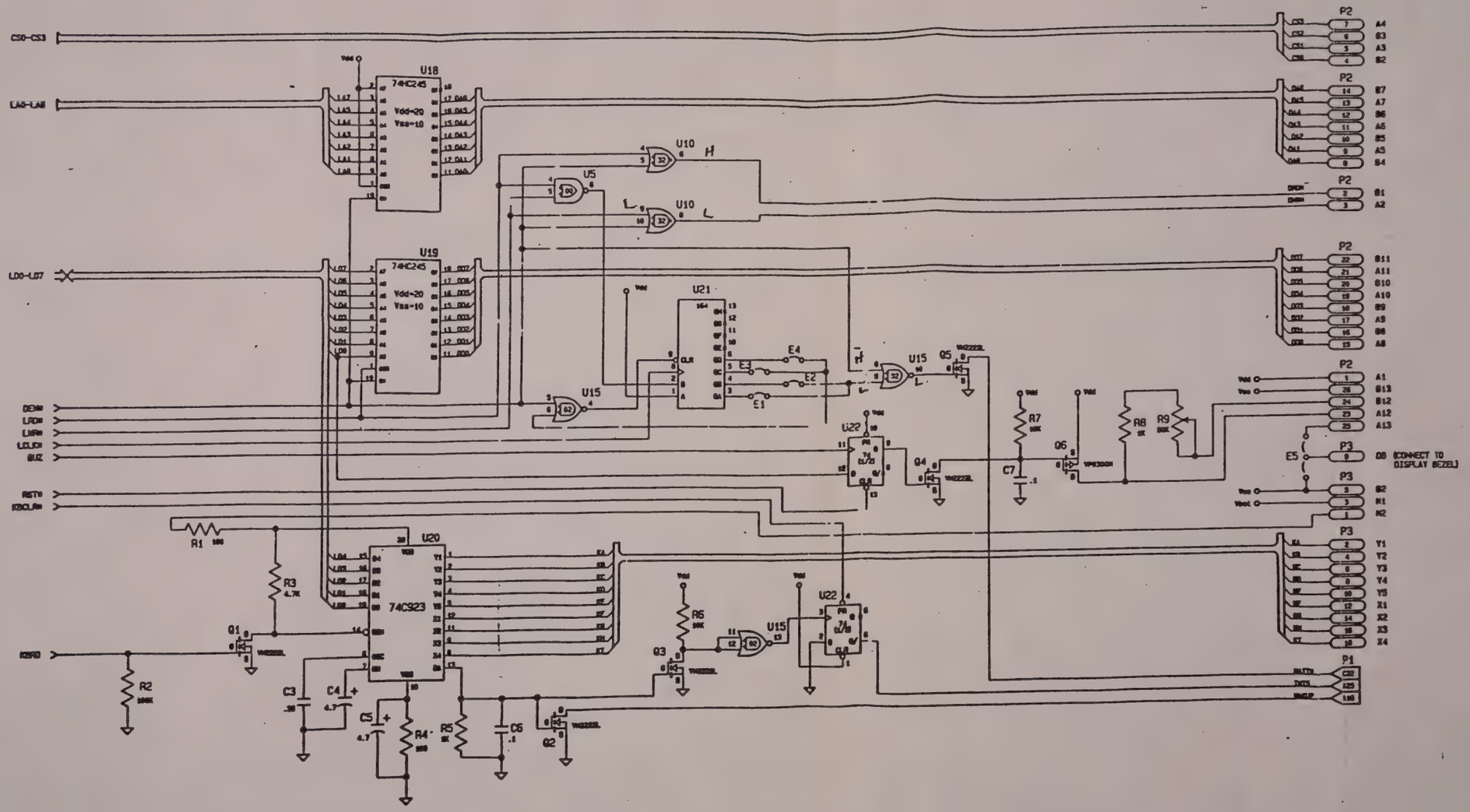


1. FOR IC's U5, 6, 10, 12, 15, 16, 21, 22 PIN 14 IS Vdd, PIN 7 IS GND (Vss); FOR IC's U9, 14 PIN 16 IS Vdd, PIN 8 IS GND; FOR U7 PIN 20 IS Vdd, PIN 10 IS GND

NOTES UNLESS OTHERWISE SPECIFIED

QTY. REQ'D.	ITEM NO.	PART NUMBER	DESCRIPTION
		GEORGE ALTER 2/17/87	COMMUNICATIONS TECHNOLOGY
		B HWU 4-6-87	RTS - FRONT PANEL INTERFACE SCHEMATIC DIAGRAM
		R. FOUST 4-3-87	DO NOT SCALE DRAWING
NEXT ASSY			SIZE D · 41059 · 23 · A

SEE SHEET 1 OF 2



ITEM NO.	QTY. REQ'D.	PART NUMBER	DESCRIPTION
		GEORGE ALTER 2/17/87	COMMUNICATIONS TECHNOLOGY
		B.HWU 4-6-87	RTS - FRONT PANEL INTERFACE SCHEMATIC DIAGRAM
		R.FOLST 4-3-87	
		DO NOT SCALE DRAWING	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE FRACTIONS DECIMALS ANGLES

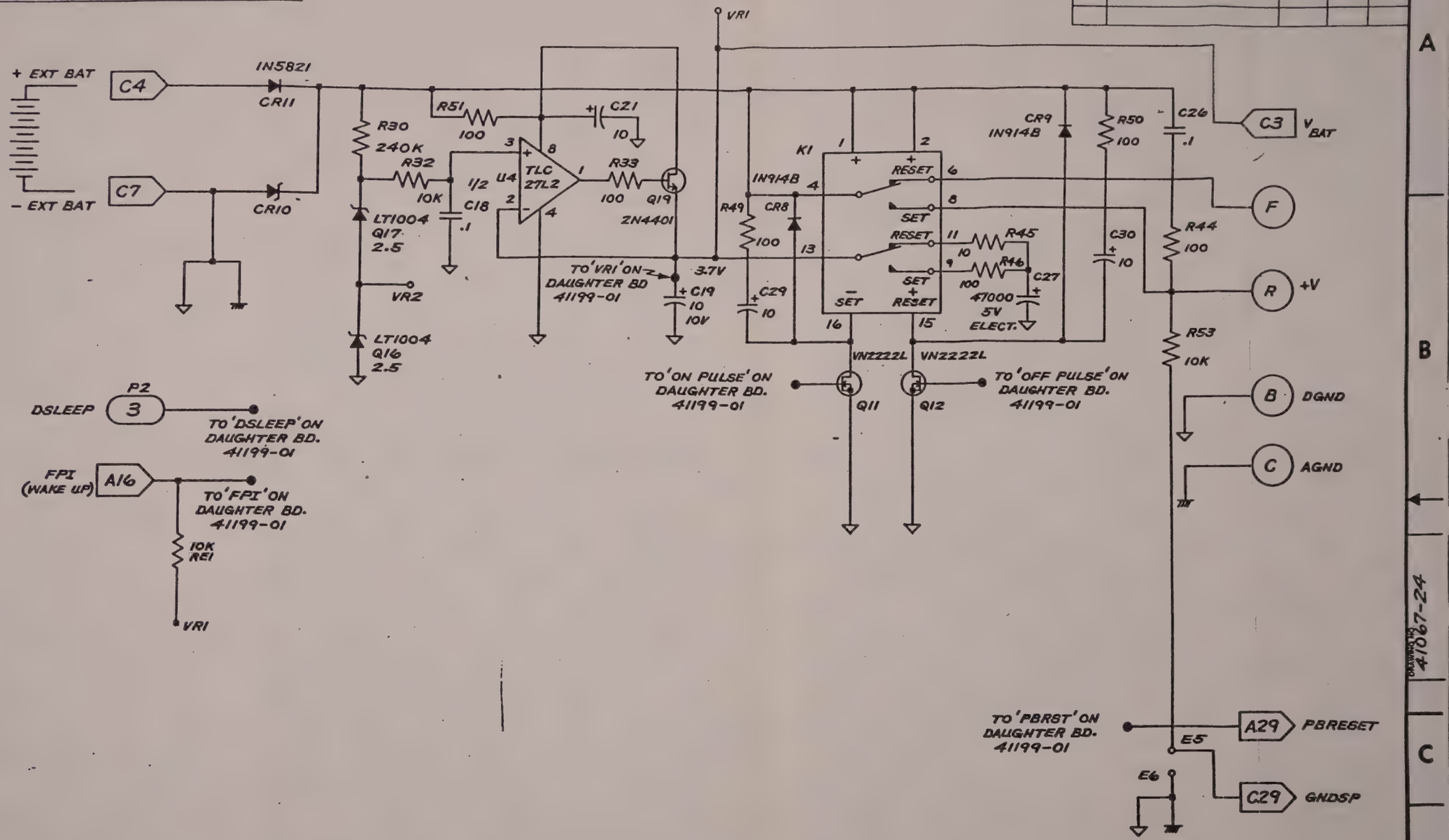
NEXT ASSY

SIZE D | 41059 | SHEET 23 | REV A

NOTES UNLESS OTHERWISE SPECIFIED

IMPORTANT — PLEASE READ
(1) This Document involves proprietary design rights of COMMUNICATIONS TECHNOLOGY CORPORATION and all design, manufacturing, production, use of sales rights regarding the same are expressly reserved.
It is submitted for a specific purpose, and recipient by acceptance of this document assumes custody and control and agrees, (A) this document will not be copied or reproduced in whole or part, or its contents revealed in any manner to any person except to meet the explicit purpose for which it was delivered and (B) that any specialty features peculiar to this design will not be incorporated in other projects.

REVISION BLOCK				
LET	REVISION -	BY	DATE	CHK
	SEE SHEET 1 OF 4			



NOTES: UNLESS OTHERWISE SPECIFIED

ITEM NO.	QTY. REQ'D.	PART NUMBER	DESCRIPTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± DECIMALS .XX ± .XXX ± ANGLES ±

MATERIAL — CTC SPEC NO
FINISH — CTC SPEC NO
NEXT ASSY

DRAWN S.T.C. 5-2-89
CHECKED
APPROVED
APPROVED
DO NOT SCALE DRAWING
MACHINE FINISH

COMMUNICATIONS TECHNOLOGY
8227 COLEY • LOS ANGELES • CA 90064-1662 • (213) 473-0294 • TWX 910-342-6862

RTS POWER SUPPLY
POWER CONTROL SCHEMATIC DIAGRAM

UNLESS OTHERWISE SPECIFIED: REMOVE BURRS AND BREAK SHARP EDGES

SCALE	SIZE	DRAWING NO	DASH NO	REV
NONE	C	41067	24	A

41067-24

Sheet 3 of 4

IMPORTANT — PLEASE READ
(1) This Document involves proprietary design rights of COMMUNICATIONS TECHNOLOGY CORPORATION and all design, manufacturing, production, use of sales rights regarding the same are expressly reserved.
It is submitted for a specific purpose, and recipient by acceptance of this document assumes custody and control and agrees (A) this document will not be copied or reproduced in whole or part, or its contents revealed in any manner to any person except to meet the explicit purpose for which it was delivered and (B) that any specialty features peculiar to this design will not be incorporated in other projects.

REVISION BLOCK				
LET	REVISION	BY	DATE	CHK
	SEE SHEET 1 OF 4			

+V (A) R41 .3 — TO 'VIN' ON DAUGHTER BD. 41199-01

TO '+5V' ON DAUGHTER BD. 41199-01

A2 — +5V — C2

C28 10

R34 20K

Q23 VP300M

A3 INH*

Q24 VN2222L

C25 4.7

VR2

U4 TLC 27L2 (pins 5, 7, 6)

C31 4.7

R31 30K

QTY. REQ'D.	ITEM NO.	PART NUMBER	DESCRIPTION
		DRAWN S.T.C. DATE 5-2-89	COMMUNICATIONS TECHNOLOGY
		CHECKED	
		APPROVED	
		APPROVED	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± DECIMALS .XX ± .XXX ± ANGLES ±

MATERIAL — CTC SPEC. NO

FINISH

DO NOT SCALE DRAWING

MACHINE FINISH

RTS POWER SUPPLY
+5V LINEAR REGULATOR SCHEMATIC DIAGRAM

UNLESS OTHERWISE SPECIFIED REMOVE BURRS AND BREAK SHARP EDGES

DRAWING NO. 41067-24

NOTES: UNLESS OTHERWISE SPECIFIED

SHEET 4 of 4

IMPORTANT — PLEASE READ
(1) This Document involves proprietary design rights of COMMUNICATIONS TECHNOLOGY CORPORATION and all design, manufacturing, production, use of sales rights regarding the same are expressly reserved.
It is submitted for a specific purpose, and recipient by acceptance of this document assumes custody and control and agrees: (A) the document will not be copied or reproduced in whole or part, or its contents revealed in any manner to any person except to meet the explicit purpose for which it was delivered and (B) that any specialty features peculiar to the design will not be incorporated in other projects.

REVISION BLOCK				
LET	REVISION	BY	DATE	CHK
	SEE SHEET 1 OF 4			

A
+V
EL. 100 16V C3
C2 .1
VN2222L Q5
R12 51K
R9 .3 1/3W 5%
C5 820PF
R8 100
78S40
R11 10K 1%
C4 4.7
R10 10K 1%
R13 75
U1
200nH L1
R7 16.5K 1%
R6 1.47K 1%
1N5821 CR3
L2 400nH
TIP29C Q6
+C6 220 25V EL.
+C7 220 25V EL.
A32 +15V
C32
A31 AGND
C31
A30 -15V
C30
A22 PFAIL*
Q9 VN2222L
R24 4.7K
R25 10K
C AGND
+5V
R14 10K
VN2222L Q7
E4
E3
C21 PWRS*
R19 100K
C10 1200PF
C9 EL. 100 16V
R20 .3 1/3W 5%
L3 200nH
1N5821 CR5
L4 400nH
+C12 220 25V EL.
+C13 220 25V EL.
Q8 TIP30C
R22 100
R23 75
78S40
U2
R15 1.33K 1%
C11 .1
R21 1K
CR4 1N914B
R17 23.7K 1%
R16 16.5K 1%
R18 24.9K 1%
C8 4.7

QTY. REQ'D.	ITEM NO.	PART NUMBER	DESCRIPTION
		DRAWN E.BEIZERMAN DATE 6/26/84	COMMUNICATIONS TECHNOLOGY
		CHECKED	
		APPROVED	
		APPROVED	
		DO NOT SCALE DRAWING	RTS POWER SUPPLY
			±15V SUPPLY SCHEMATIC DIAGRAM

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS ± DECIMALS .XX ± .XXX ± ANGLES ±
MATERIAL
CTC SPEC NO
FINISH
MACHINE FINISH
UNLESS OTHERWISE SPECIFIED REMOVE BURRS AND BREAK SHARP EDGES

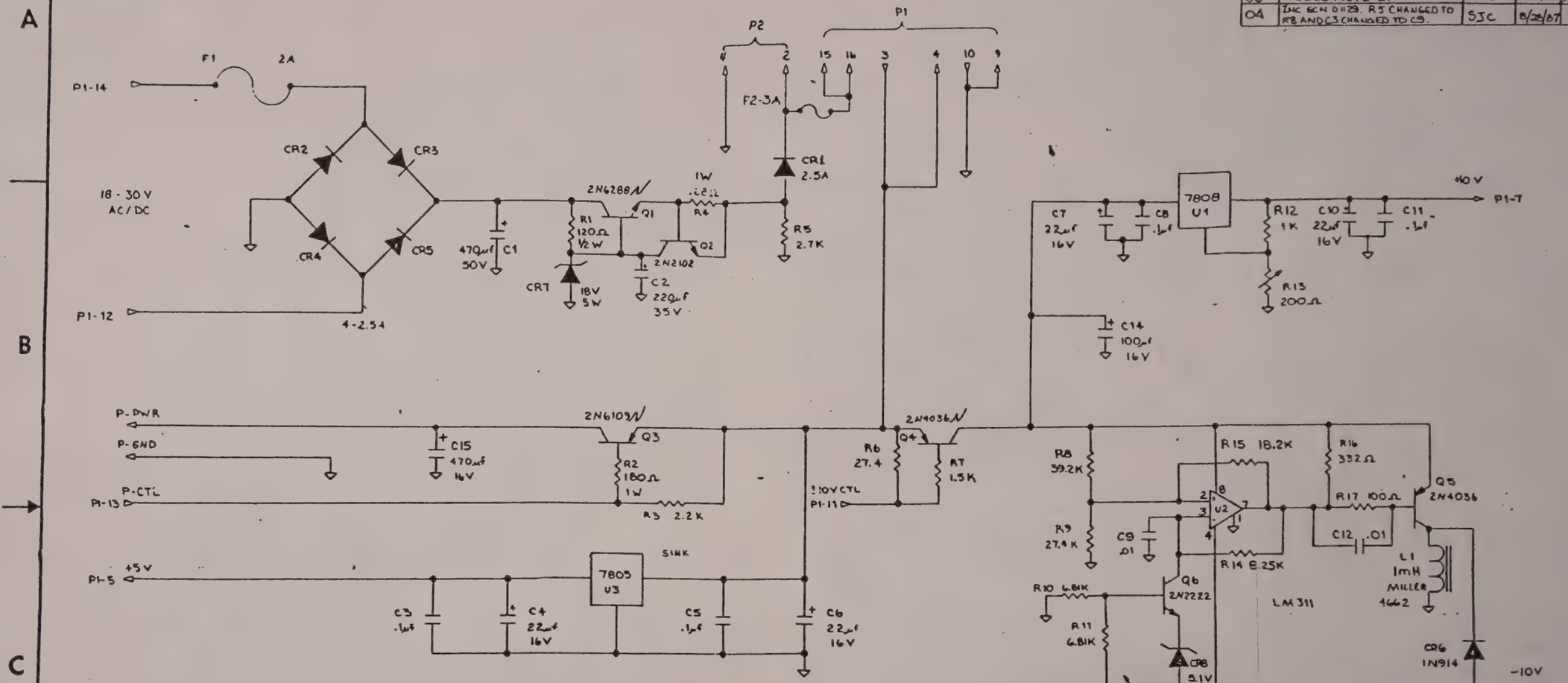
DRAWING NO. 41067-24

NOTES: UNLESS OTHERWISE SPECIFIED

SLM U1A

IMPORTANT – PLEASE READ
(1) This Document contains proprietary design rights of COMMUNICATIONS TECHNOLOGY CORPORATION and all design, manufacturing, production, use of sales rights regarding the same are expressly reserved.
(2) It is furnished for a specific purpose and recipient by acceptance of this document assumes custody and control and agrees: (A) this document will not be copied or reproduced in whole or part or its contents revealed in any manner to any person except to meet the express purpose for which it was delivered and (B) that any proprietary features peculiar to the design will not be incorporated in other projects.

REVISION BLOCK				
LET	REVISION	BY	DATE	CHK
01	INC. ECN'S 1106 THRU 1114	SCT	7-30-84	
02	Changed Misc-ts	JP	12-6-85	
03	ADDED NOTE 2.	SJC	6/12/87	S.C.
04	INC ECN 01129. R5 CHANGED TO R8 AND C3 CHANGED TO C9.	SJC	8/28/87	



NOTES
1. P-PWR AND P-GND ARE WIRES SOLDERED TO BOARD LOCATED ALONG TOP OF BOARD.
2. ON 351-2105-0002 ASSEMBLY, P1-5 IS CONNECTED TO P1-6.

ENGINEERING
JAN 17 1991

QTY. REQ'D.	ITEM NO.	PART NUMBER	DESCRIPTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE
FRACTIONS ± DECIMALS XX ± XXX ± ANGLES ±
MATERIAL
CTC SPEC NO
FINISH
NEXT ASSY

DRAWN	SCT	02885
CHECKED	PADDOCK	7-1-85
APPROVED		
APPROVED		

DO NOT SCALE DRAWING
MACHINE FINISH

COMMUNICATIONS TECHNOLOGY

SCHEMATIC - POWER BOARD

UNLESS OTHERWISE SPECIFIED REMOVE BURRS AND BREAK SHARP EDGES

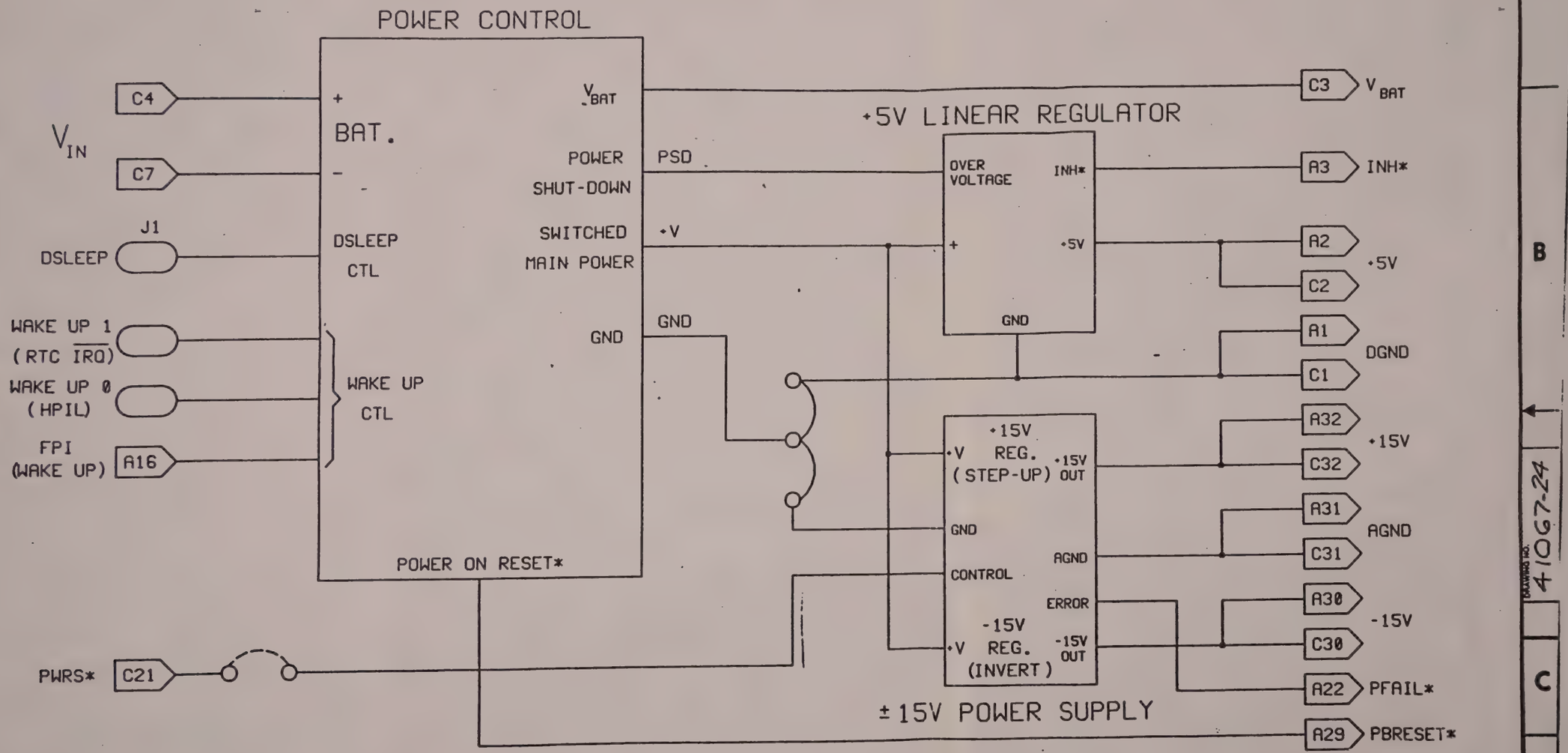
SCALE — SIZE C | 353-2105-C0C1 | REV 04

SHEET 1 OF 1

DRAWING NO 300-2105-04

IMPORTANT — PLEASE READ
(1) This Document involves proprietary design rights of COMMUNICATIONS TECHNOLOGY CORPORATION and all design, manufacturing, production, use of sales rights regarding the same are expressly reserved.
It is submitted for a specific purpose, and recipient by acceptance of this document assumes custody and control and agrees: (A) the document will not be copied or reproduced in whole or part, or its contents revealed in any manner to any person except to meet the explicit purpose for which it was delivered and (B) that any specialty features peculiar to this design will not be incorporated in other projects.

REVISION BLOCK				
LET	REVISION	BY	DATE	CHK
NC	INITIAL RELEASE PER ECN L1370	G.T.C.	5-2-84	
A	REVISED PER ECN D1477	G.T.C.	7-31-84	



ITEM NO.	QTY. REQ'D.	PART NUMBER	DESCRIPTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± DECIMALS .XX ± .XXX ± ANGLES ±

MATERIAL
CTC SPEC NO.
FINISH
CTC SPEC NO.
NEXT ASSY
MACHINE FINISH

		DATE
DRAWN	E.BEIZERMAN	1/20/84
CHECKED		
APPROVED		
APPROVED	C.WAAS	6/26/84

DO NOT SCALE DRAWING

COMMUNICATIONS TECHNOLOGY
2237 COLBY • LOS ANGELES • CA 90064-1582 • (213) 473-2094 • TWX 910-342-6863

RTS POWER SUPPLY
BLOCK DIAGRAM

UNLESS OTHERWISE SPECIFIED REMOVE BURRS AND BREAK SHARP EDGES

SCALE	SIZE	DWG NO	REV
NONE	C	41067	A
SHEET 1 OF 4		24	

DRAWING NO. 41067-24

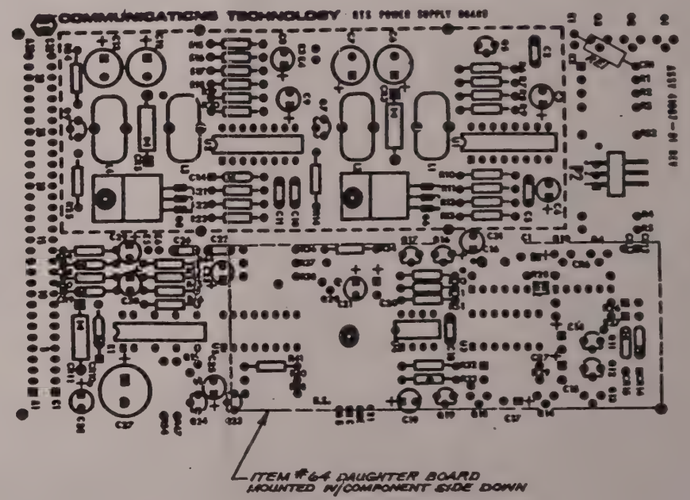
NOTES: UNLESS OTHERWISE SPECIFIED

IMPORTANT — PLEASE READ
(1) This Document (material, proprietary design rights of COMMUNICATIONS TECHNOLOGY CORPORATION and all design, manufacturing, production, use of sales rights regarding the same are proprietary reserved.
It is submitted for a specific purpose, and agreement by acceptance of this document assumes, expressly and covenant and agrees, (A) that document will not be copied or reproduced in whole or part, or its contents revealed in any manner or by any person except to meet the implied purpose for which it was delivered and (B) that any ownership features granted to the design will not be infringed upon in other projects.

REVISION BLOCK				
LET	REVISION	BY	DATE	CHK
N/C	INITIAL RELEASE PER EN 6477	E.B.	1-23-84	
A	REVISED PER EN 6580	E.B.	12-30-84	
B	6717	E.B.	1-7-85	
C	6753	E.B.	1-14-85	
D	6787	S.L.	1-23-85	
E	6899	M.T.	3-4-85	
F	7135	M.T.	6-12-85	
G	7161	M.T.	6-27-85	
H	7617	G.F.	1-21-86	
J	7721	S.L.	3-6-86	
K	8441	S.L.	4-29-87	
L	REVISED PER EN 8481	S.L.	9-21-87	
M	REVISED PER ECN D1321	J.S.	1-28-89	
N	REVISED PER ECN D1370	S.T.C.	4-27-89	
N1	REVISED ECN D1460	P.B.	7-11-89	
P	REVISED PER ECN D1477	S.T.C.	7-31-89	
R	REVISED ECN D1522	P.B.	10-11-89	

QTY. REQ'D	ITEM NO.	PART NUMBER	DESCRIPTION	REF. DES.
1	31	45348-01	RESISTOR,CARBON FILM 5% 1/4W 51K	R12
1	30	45000-14	RESISTOR,CARBON FILM 5% 1/4W 4.7K	R24
7	29	45000-13	RESISTOR,CARBON FILM 5% 1/4W 100 OHM	R.8,22,33,44,46,60,61
1	28	45000-10	RESISTOR,CARBON FILM 5% 1/4W 10 OHM	R45
4	27	45000-02	RESISTOR,CARBON FILM 5% 1/4W 10K	R14,25,32,63,/NF/
1	26	45000-01	RESISTOR,CARBON FILM 5% 1/4W 1K	R21
1	25	44514-01	RELAY,DS2E-SL2-DC6V	K1
	24			
1	23	44194-01	IC,27L2	U4
2	22	44192-01	IC,LM385 Z-2.5	Q16,17
2	21	44119-01	IC,UA78S40	U1,2
	20			
2	19	41206-01	INDUCTOR,40OHM	L2,4
2	18	41205-01	INDUCTOR,700HX	L1,3
	17			
1	16	41535-01	CONNECTOR,64 PIN	P1
1	15	41512-01	CONNECTOR,3 PIN	P2
3	14	42021-01	DIODE,1N5821	CR3,5,11
3	13	42003-01	DIODE,1N914B	CR4,6,9
1	12	40635-01	CAPACITOR,ELECTROLYTIC 47000MF 8V	C27
1	11	40634-01	CAPACITOR,CERAMIC 1000PF 50V	C23
1	10	40632-01	CAPACITOR,CERAMIC 1200PF 50V	C10
4	9	40631-01	CAPACITOR,ELECTROLYTIC 220MF 25V	C6,7,12,13
1	8	40630-01	CAPACITOR,CERAMIC 820PF 50V	C8
2	7	40702-01	CAPACITOR,ALUMINUM 100MF 16V 20%	C3,9
4	6	40587-01	CAPACITOR,TANTALUM 10MF 25V	C21,28-30
1	5	40686-01	CAPACITOR,TANTALUM 10MF 6.3V	C19
8	4	40685-01	CAPACITOR,TANTALUM 4.7MF 10V	C4,8,22,26,31
4	3	40680-01	CAPACITOR,POLYESTER FILM .1MF 63V	C2,11,18,26
	2			
1	1	41066-01	PRINTED CIRCUIT BOARD	

QTY. REQ'D	ITEM NO.	PART NUMBER	DESCRIPTION	REF. DES.
1	65	1902-0554	DIODE,IN4740A	CR10
1	64	41199-01	DAUGHTER BOARD	
4	63	32213-01	COIL,SEAT	L1-4
	62			
	61			
8	60	30842-02	WASHER,SPLIT NO.4	Q6,8
8	59	60029-10	NUT,4-40	Q6,8
8	58	60181-02	SCREW,PAN HEAD 4-40X5/16 CAD	Q6,8
1	57	46533-01	TRANSISTOR,VP0300N	Q23
	56			
6	55	46531-01	TRANSISTOR,VN2222L	Q5,7,9,11,12,24
1	54	46529-01	TRANSISTOR,TIP29C	Q6
1	53	46523-01	TRANSISTOR,TIP30C	Q8,
	52			
1	51	46506-01	TRANSISTOR,2N4401	Q19
	50			
1	49	0757-0317	RESISTOR,METAL FILM 1% 1/8W 1.33K	R15
2	48	46320-01	RESISTOR,METAL FILM 1% 1/8W 16.5K	R7,16
	47			
1	46	45307-01	RESISTOR,CARBON FILM 5% 1/4W 240K	R30
1	45	0757-1094	RESISTOR,METAL FILM 1% 1/8W 1.47K	R6
1	44	45275-01	RESISTOR,METAL FILM 1% 1/8W 24.9K	R18
3	43	45226-01	RESISTOR,METAL FILM 5% 1/3W .3 OHM	R9,20,41
	42			
2	41	45100-17	RESISTOR,METAL FILM 1% 1/4W 10K	R10,11
	40			
1	39	45168-01	RESISTOR,CARBON FILM 5% 1/2W 100K	R19
1	38	45163-01	RESISTOR,CARBON FILM 5% 1/4W 20K	R34
	37			
	36			
1	35	45100-20	RESISTOR,METAL FILM 1% 1/4W 23.7K	R17
2	34	45029-01	RESISTOR,CARBON FILM 5% 1/4W 75 OHM	R13,23
	33			
1	32	45000-27	RESISTOR,CARBON FILM 5% 1/4W 30K	R31



ITEM #64 DAUGHTER BOARD MOUNTED W/COMPONENT SIDE DOWN

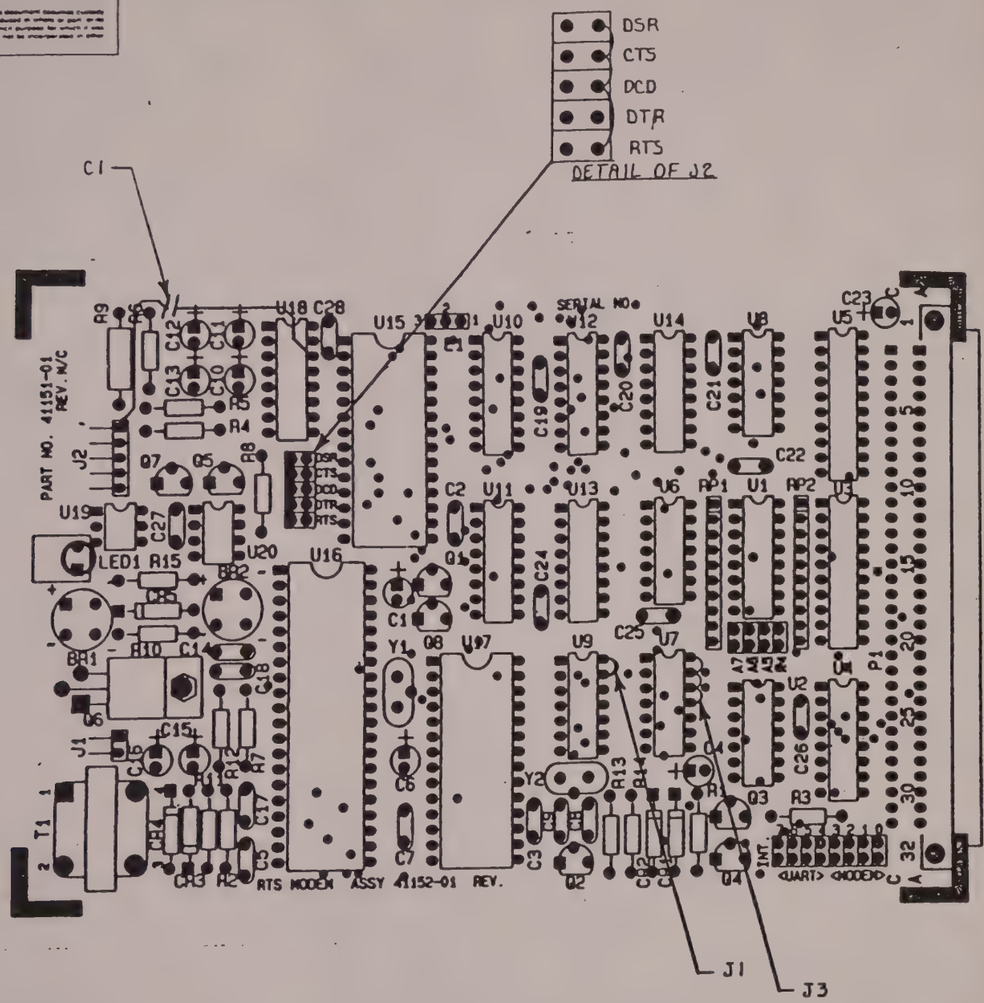
NOTES: UNLESS OTHERWISE SPECIFIED

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± | DECIMALS .XX ± .01, .XXX ± | ANGLES ±
MATERIAL: CTC SPEC NO
FINISH: CTC SPEC NO
DRAWN: S.T.C. 4-27-89
CHECKED: P.B. Effron 4-27-89
APPROVED
APPROVED
DO NOT SCALE DRAWING
NEXT ASSY

COMMUNICATIONS TECHNOLOGY
POWER SUPPLY BOARD ASSY.
RTS (NEW BUILD 5-1-89)
UNLESS OTHERWISE SPECIFIED REMOVE BURRS AND BREAK SHARP EDGES
SCALE NONE | SIZE D | 41067 | DASH NO 03 | REV R
SHEET 1 of 1

IMPORTANT — PLEASE READ
This drawing contains information which is the property of COMMUNICATIONS TECHNOLOGY CORPORATION and all design manufacturing production use and reproduction rights thereto are reserved.
It is furnished for a specific purpose and recipient by acceptance of this document agrees (A) this document will not be shown or reproduced in whole or part or be used, furnished or disclosed to any person except to meet the specific purpose for which it was furnished and (B) that any special rights granted pursuant to the design will not be infringed upon or used.

REVISION BLOCK				
LET	REVISION	BY	DATE	CHK
NR	INITIAL REL. DRN 0003	[illegible]	9-6-89	P.B.



CUTS		
C	FROM	TO
1	U18-14	J2-1

JUMPERS		
J	FROM	TO
1	U9-13	U9-14
2	DSR	CTS
	CTS	DCD
	DCD	RTS
3	U7-11	U7-12
	U7-12	U7-13
	U7-13	U7-14

QTY. REQ'D.	ITEM NO.	PART NUMBER	DESCRIPTION	
1	24	49153-01	XTAL-1.8432M-PAR RES-18PF	Y2
1	23	46533-01	TRANSISTOR-VP0300M	Q1
4	22	40319-01	CAP-22UF-16V-20%-TANT	C10-13
2	21	40508-01	CAP-56PF-200V-10% CER	C8, C9
11	20	40580-01	CAP-1UFD-63V-10%-POLYE	C2,C3,C11-12,C24-26,C28
1	19	40588-01	CAP-33 UFD-10V-10% TANT	C1
1	18	41537-01	CONN, CIMBUS-STD MALE	P1
1	17	41633-01	CONN.-5 PIN-AMP	J2
1	16	44079-01	IC-74HC74	U7
1	15	44081-01	IC-74HC32	U8
2	14	44084-01	IC-74HC245	U3, U5
1	13	44088-01	IC-74HC02	U2
1	12	44090-01	IC-74HC175	U14
1	11	44136-01	IC-74HC85-4BIT COMP	U1
1	10	44176-01	IC-65SC51-CMOS UART-2MHZ	U17
1	9	44183-01	IC-74HC239	U4
1	8	44203-01	IC-74HC1104-HEX INVERTER	U9
1	7	44239-01	IC-74HC10	U6
1	6	44296-01	IC-MAX 232 CPE	U18
1	5	45100-12	RES RN55D-2K OHM-1%	R14
2	4	45204-01	RES PK-10 PIN-10K SIP	RP1, RP2
1	3	45391-01	RES-2MEG-1/4W-1%-MF	R13
1	2	41152-02P	PROCESS ASSY FOR 41152-02	
—	1	41151-01	PCB-FAB- RTS MODEM	
-02				

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE FRACTIONS DECIMALS ANGLES .XX .XXX

DRAWN W. WILSON 7-6-89
CHECKED 8-17-89
APPROVED 8-17-89

DO NOT SCALE DRAWING

COMMUNICATIONS TECHNOLOGY
DENISON, TEXAS 75020

PCA, RTS UART RS232 ASSEMBLY DRAWING

SIZE D | 41152 | 02 | NR

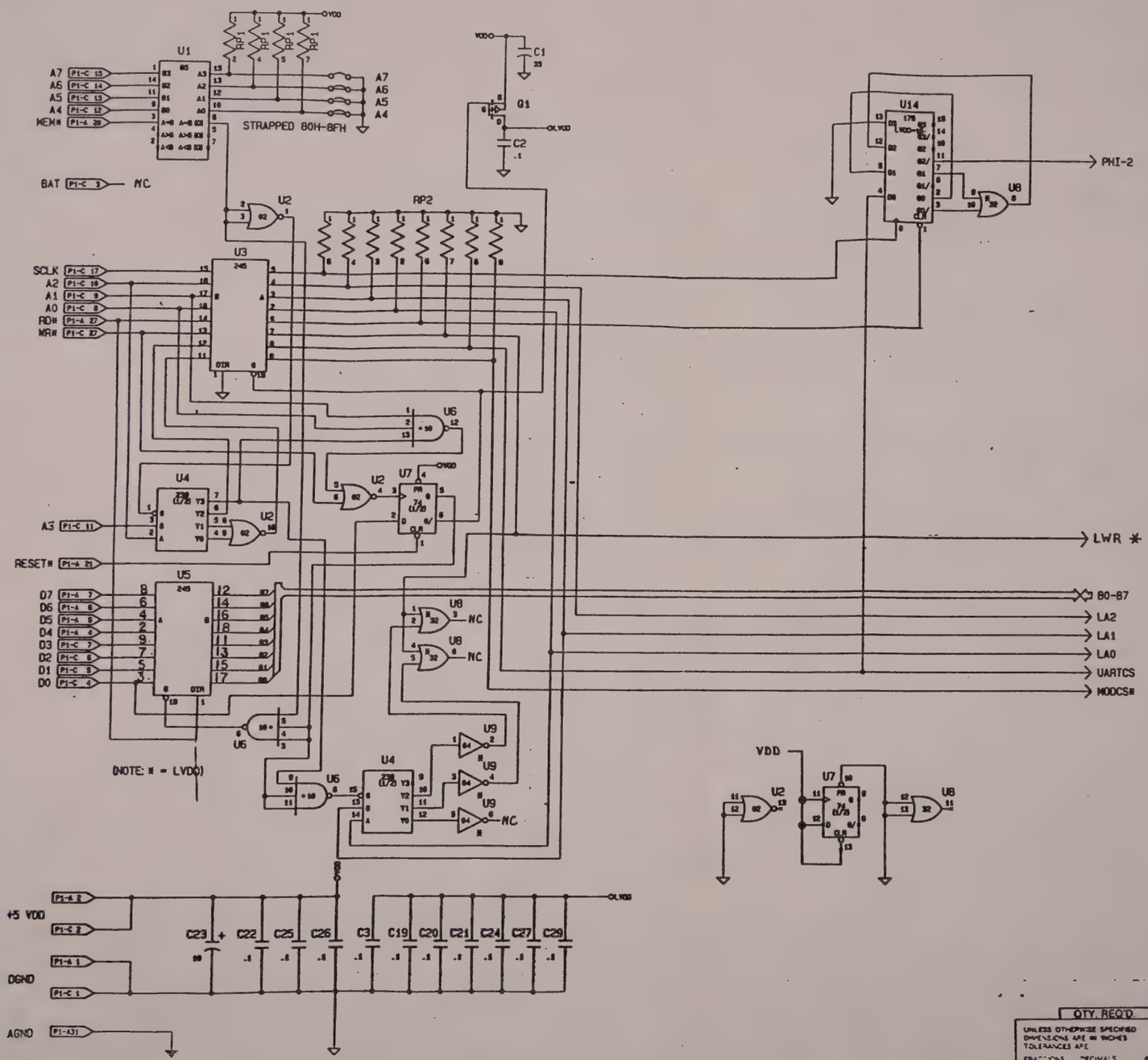
1. MAX LEAD TRIM LENGTH .050.

NOTES. UNLESS OTHERWISE SPECIFIED

IMPORTANT — PLEASE READ
(C) The Document contains proprietary design rights of COMMUNICATIONS TECHNOLOGY CORPORATION and all design, manufacturing, production, use of sales rights regarding this same are proprietary material.
It is submitted for a specific purpose and recipient for consideration of this document assumes custody and express duty that the document will not be copied or reproduced in whole or part, or its contents released in any manner to any person except to meet the implied purpose for which it was delivered and will return this immediately upon request or at the completion of the consideration thereof, or upon completion of the project.

REVISION BLOCK

LET	REVISION	BY	DATE	CHK
N/R	INITIAL RELEASE DRN 0003		2-6-89	PD
NR1	REVISED PER ECN DIS80	KAS	2-14-90	PD



NOTES UNLESS OTHERWISE SPECIFIED

QTY. REQ'D.	ITEM NO.	PART NUMBER	DESCRIPTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE
FRACTIONS : DECIMALS .XX : .XXX : ANGLES :

E. BEITZERMAN 4/21/87

DO NOT SCALE DRAWING

COMMUNICATIONS TECHNOLOGY

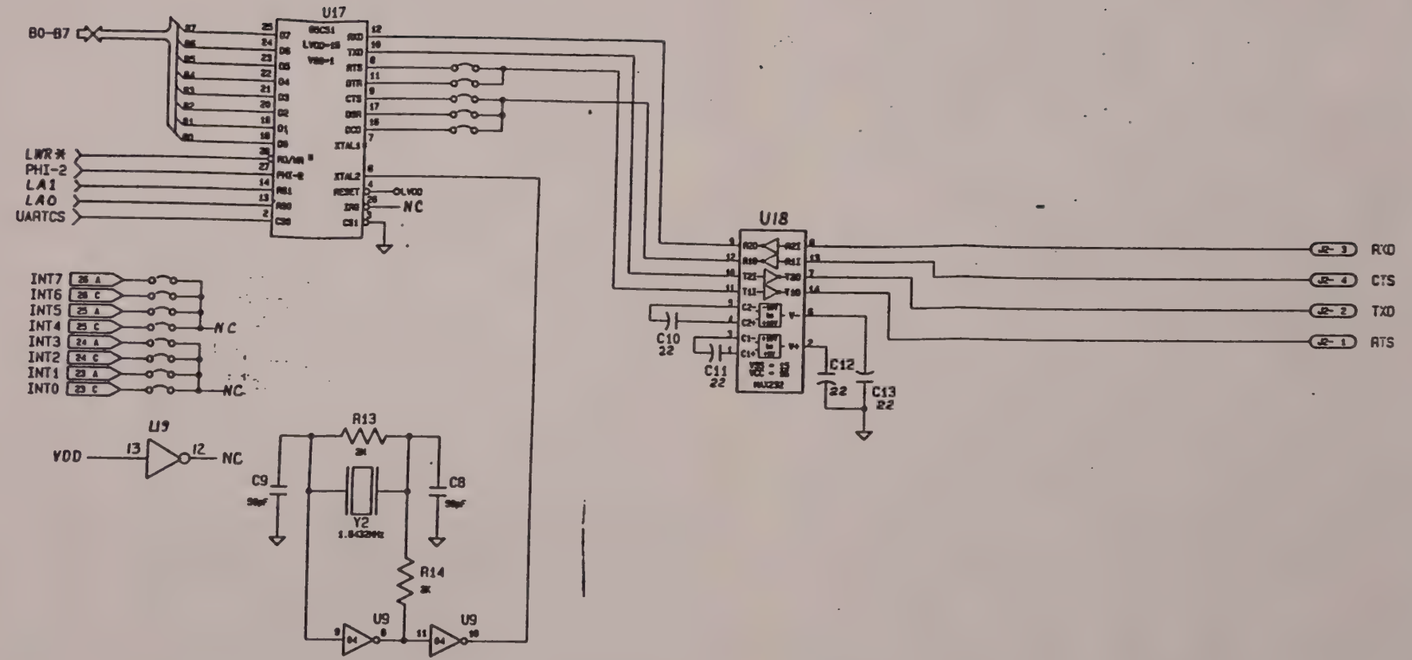
RTS UART RS232
SCHEMATIC DIAGRAM

UNLESS OTHERWISE SPECIFIED REMOVE BURRS AND BREAK SHARP EDGES

SCALE: NONE SIZE D SHEET OF

...contained herein and all design, manufacturing, production use of same not to be used for any purpose not authorized for in writing by same, and respect to inventions of the described drawings, patents and patents pending, and this document will not be loaned or reproduced in whole or part, or its contents divulged to any manner by any person except to meet the explicit purpose for which it was issued, and will not any warranty, express or implied, as to the design and not to be interpreted as it was issued.

REVISION BLOCK				
LET	REVISION	BY	DATE	CHK
	SEE SHEET 1 OF 2		9.6.19	



NOTES UNLESS OTHERWISE SPECIFIED

ITEM NO.	QTY. REQ'D.	PART NUMBER	DESCRIPTION
		E. BEIZERMAN	COMMUNICATIONS TECHNOLOGY
		DO NOT SCALE DRAWING	RTS UART RS232 SCHEMATIC DIAGRAM

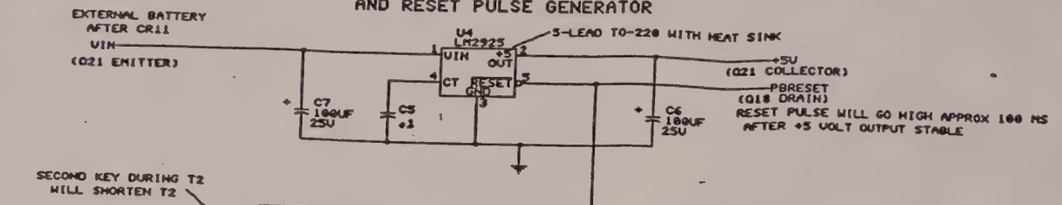
NEXT ASSY

SCALE NONE | SIZE D | 41152 | 23

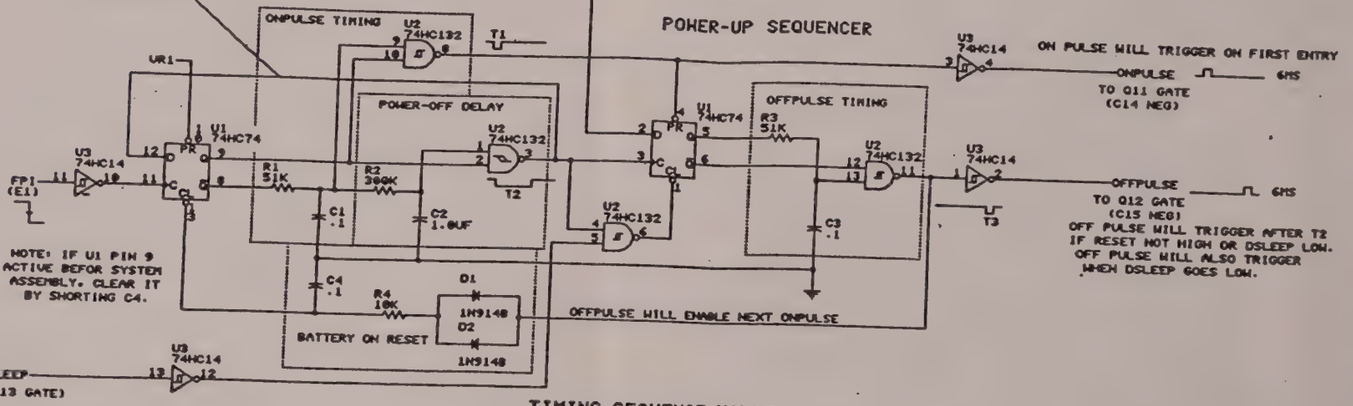
IMPORTANT — PLEASE READ
(1) This Document embodies proprietary design rights of COMMUNICATIONS TECHNOLOGY CORPORATION and all design, manufacturing, production, use of sales rights regarding the same are expressly reserved.
It is submitted for a specific purpose, and recipient by acceptance of this document assumes custody and control and agrees: (A) this document will not be copied or reproduced in whole or part, or its contents revealed in any manner to any person except to meet the explicit purpose for which it was delivered and (B) that any specialty features peculiar to this design will not be incorporated in other projects.

REVISION BLOCK				
LET	REVISION	BY	DATE	CHK
N/C	INITIAL RELEASE ECN D1370	[illegible]	4/27/87	
A	REVISED PER ECN D1519	J.S.	10/6/88	CAF

+5 VOLT MAIN POWER REGULATOR AND RESET PULSE GENERATOR



POWER-UP SEQUENCER

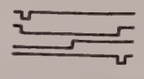


NOTE: IF U1 PIN 9 ACTIVE BEFOR SYSTEM ASSEMBLY. CLEAR IT BY SHORTING C4.

U1, U2, AND U3 POWER FROM VR1 PIN 14 = VR1, PIN 7 = GND

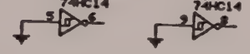
TIMING SEQUENCE VALUES

T1 = R1.C1 TIMING FOR ON PULSE TO RELAY.	6.0 MS
T2 = R2.C2+R1.C1 TIMING FOR POWER OK TEST	300 MS
T3 = R3.C3 TIMING FOR OFF PULSE TO RELAY	5.5 MS
T4 = R4.C4 BATTERY POWER-ON RESET DELAY	1 MS
T5 = C1.U4 RESET PULSE TIMING	100 MS



T1, T2, T3 WILL BE INACTIVE WHEN BATTERY APPLIED

UNUSED GATES



NOTES: UNLESS OTHERWISE SPECIFIED

QTY. REQ'D.	ITEM NO.	PART NUMBER	DESCRIPTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± DECIMALS .XX ± .XXX ± ANGLES ±

DRAWN S.T.C. DATE 4/27/87
CHECKED [signature] 4-27-87
APPROVED
APPROVED
MATERIAL — CTC SPEC NO
FINISH — CTC SPEC NO
MACHINE FINISH
DO NOT SCALE DRAWING
NEXT ASSY

COMMUNICATIONS TECHNOLOGY
[illegible] COLBY • LOS ANGELES • CA 90064-1582 • (213) 473-8004 • TWX 910-342-6963

RTS POWER SUPPLY DAUGHTER BOARD SCHEMATIC

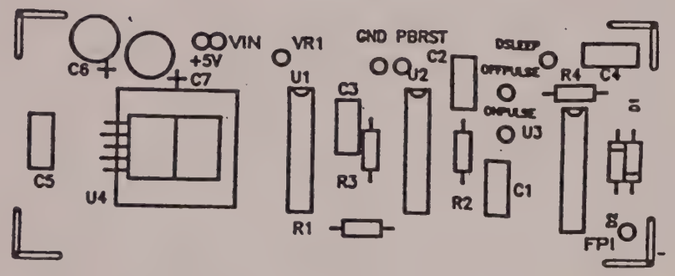
UNLESS OTHERWISE SPECIFIED REMOVE BURRS AND BREAK SHARP EDGES

SCALE NONE | SIZE C | 41199 | DASH NO 22 | REV A
SHEET 1 OF 1

DRAWING NO. 41199-22

IMPORTANT — PLEASE READ
(1) This EDocument contains proprietary design rights of COMMUNICATIONS TECHNOLOGY CORPORATION and all design, manufacturing, production, use of sales rights regarding the same are expressly reserved.
It is submitted for a specific purpose, and recipient by acceptance of this document assumes custody and covenant and agrees: (A) this document will not be copied or reproduced in whole or part, or its contents disclosed or any manner to any person except to meet the express purpose for which it was delivered, (B) that any proprietary features peculiar to this design will not be incorporated in other projects.

REVISION BLOCK				
LET	REVISION	BY	DATE	CHK
N.C.	INITIAL RELEASE ECN D1370	[signature]	4/27/89	
A	REVISED PER ECN D1390	G.T.C.	5-10-89	



QTY REQ'D	ITEM NO.	PART NUMBER	DESCRIPTION	REF. DES.
1	19	3084202	WASHER,#4 SPLIT	
1	18	3084201	WASHER,#4 FLAT	
1	17	6016301	SCREW,PH #4-40 X 1/2"	
1	16	4728801	STANDOFF,4-40X1/4"X.375 RD FEMALE	
1	15	4260201	HEAT SINK	U1
5	14	121-0015-1501	CONN,PCB HEADER STRIP 1 X 1	
1	13	121-0015-1502	CONN,PCB HEADER STRIP 1"X2"X.1"	
2	12	4200301	DIODE,1N914B	D1,2
2	11	4070301	CAPACITOR,ELECTRO 100UF 25V	C6,7
1	10	4065201	CAPACITOR,METAL POLYESTER 1.0UF 63V 10%	C2
4	9	4058001	CAPACITOR,POLYESTER FILM .1UF 63V	C1,3,4,5
1	8	4500002	RESISTOR,10K OHM 5% 1/4 W	R4
1	7	4516101	RESISTOR,300K OHM 5% 1/4 W	R2
2	6	4534801	RESISTOR,51K OHM 5% 1/4 W	R1,R3
1	5	4431101	IC,LM2925T LO/OUT 5V REG T/RST OUT	U4
1	4	4409401	IC,74HC14 HEX SCHMITT INVERTER	U3
1	3	4408001	IC,74HC132 QUAD NAND SCHMITT	U2
1	2	4407901	IC,74HC74 DUAL D FLIP-FLOP	U1
1	1	4119801	PCB,DAUGHTER BOARD RTS POWER SUPPLY	FAB

NOTES:
1. 4" JUMPER FROM 'FPI' ON DAUGHTER BD. TO 'E1' ON PWR. SUPPLY PCB (COLOR WHITE - 28 GA).
2. 1" JUMPER FROM 'VR1' ON DAUGHTER BD. TO 'C19 (+PIN)' ON PWR SUPPLY PCB (COLOR RED - 28 GA).

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± DECIMALS .XX ± .XXX ± ANGLES ±
MATERIAL
CTC SPEC NO
FINISH
CTC SPEC NO

		DATE
DRAWN	G.T.C.	3-23-89
CHECKED	[signature]	4-27-89
APPROVED		
APPROVED		

DO NOT SCALE DRAWING
MACHINE FINISH

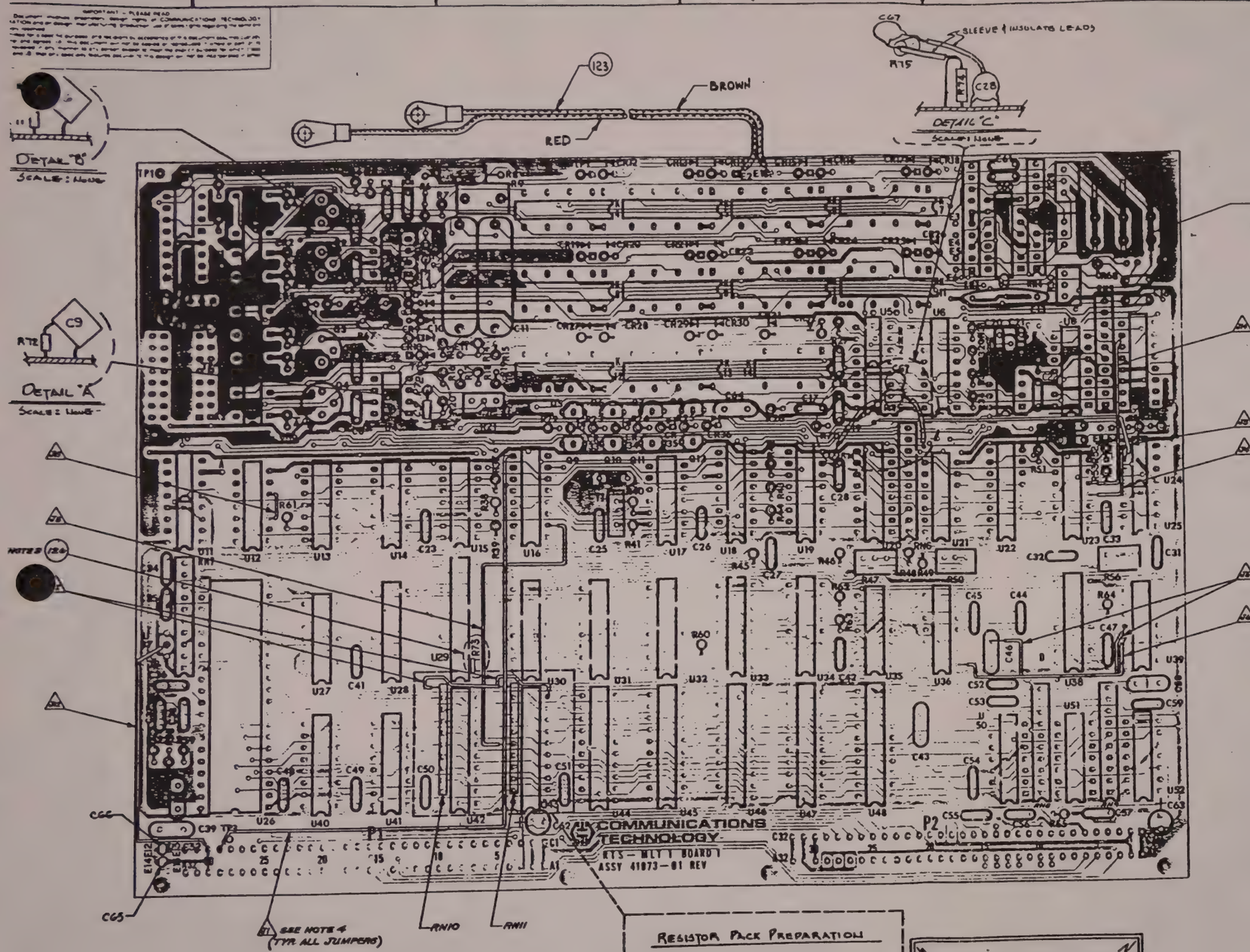
COMMUNICATIONS TECHNOLOGY
DENISON, TEXAS 75020

PCA, RTS DAUGHTER BOARD

UNLESS OTHERWISE SPECIFIED REMOVE BURRS AND BREAK SHARP EDGES

SCALE	SIZE		DASH NO	REV
1-1	C	41199	01	A
SHEET 1 OF 1				

10-6114



LET	REVISION	BY	DATE	CHK
U	REVISED - EN8312	SF	12-28-87	BHC
V	REVISED - EN 8489	S.L.	5-26-87	BHC
W	REVISED - EN 8681	S.L.	9-21-87	BHC
X	REVISED - EN 8901	S.L.	3-17-88	BHC
Y	REVISED - EN 8911	S.L.	4-7-88	BHC
AA	REVISED - EN 8938	S.L.	4-15-88	BHC
AB	REVISED PER ECN DM40	S.T.C.	6-22-89	BHC
AC	REVISED PER ECN DM71	S.T.C.	7-19-89	BHC
AC1	DOC.CHG. ECN D1517	P.B.	10-3-89	BHC
AD	REVISED ECN D1585	K.B.S	2-6-90	BHC

REVISION BLOCK

LET	REVISION	BY	DATE	CHK
N/C	INITIAL RELEASE PER EN 6459	E.B.	5-27-85	CG
A	REVISED PER EN 6566	E.B.	8-23-85	BHC
B	REVISED PER EN 6731	E.B.	11-7-85	CG
C	REVISED PER EN 6752	E.B.	12-4-85	CG
D	REVISED PER EN 6792	S.L.	12-23-85	CG
E	REVISED PER EN 6803	M.T.	12-27-85	CG
F	REVISED PER EN 6889	E.B.	2-25-86	CG
G	REVISED PER EN 6909	M.T.	3-7-86	CG
H	REVISED-EN 7009	SS	4-18-86	BHC
J	REVISED PER EN 7035	M.T.	5-28-86	CG
K	REVISED PER EN 7161	M.T.	7-21-86	CG
L	REVISED PER EN 7282	WDY	9-30-86	BHC
M	REVISED PER EN 7497	E.B.	11-5-86	BHC
N	REVISED PER EN 7569	WDY	12-30-86	CG
P	REVISED-EN 7583	SF	1-8-87	CG
Q	REVISED - EN 7631	SL	1-29-87	BHC
R	REVISED - EN 7721	S.L.	3-6-87	BHC
S	REVISED - EN 8242	S.L.	7-16-87	BHC
T	REVISED - EN 8300	S.L.	7-21-87	BHC

-03	-02	-01	ITEM NO	PART NUMBER	DESCRIPTION	REF. DES.
		1	48	44234-01	IC 4046	U19
		1	39	44204-01	IC 74HC4020	U18
		2	38	44203-01	IC 74HCU04	U12,17
		1	37	44186-01	IC ICL 7109 CPL	U26
		1	36	44185-01	IC 4070	U21
		1	35	44136-01	IC 74HC85	U40
		1	34	44106-01	IC 5089	U34
		1	33	44101-01	IC HI1-508-5	U16
		4	32	44100-01	IC HI1-303-5	U13,14,39,51
		1	31	44093-01	IC 74HC08	U27
		5	30	44087-01	IC 74HC273	U44-48
		2	29	44086-01	IC 74HC138	U28,41
		2	28	44084-01	IC 74HC245	U42,43
		1	27	44079-01	IC 74HC74	U23
		3	26	44057-01	IC 4526	U30-32
		1	25	44028-01	IC 4051	U20
		28	24	42003-01	DIODE 1N914B	CR1-6,11-32
		8	23	42001-01	DIODE 1N4004	CR7-10,33-36
		1	22	49117-01	CRYSTAL 3.579545MHz	Y1
		2	21	41537-01	CONNECTOR 64 PIN	P1,P2
		2	20	40654-01	CAPACITOR MET. POLYCARBONATE .01µF	C60,61
		2	19	40653-01	CAPACITOR MET. POLYCARBONATE 2200pF	C30,32
		6	18	40652-01	CAPACITOR MET. POLYESTER 1µF	C27,38,40,43,46,64
		1	17	40659-01	CAPACITOR MET. POLYESTER .01µF	C38
		2	16	40650-01	CAPACITOR MET. POLYESTER .047µF	C36,37
		1	15	40661-01	CAPACITOR MET. POLYESTER .33µF	C52
		3	14	40648-01	CAPACITOR MET. POLYCARBONATE .001µF	C29,33,45
		2	13	40647-01	CAPACITOR MET. POLYCARBONATE .047µF	C15,16
		1	12	40646-01	CAPACITOR MET. POLYCARBONATE 1µF	C13
		4	11	40645-01	CAPACITOR MET. POLYCARBONATE .1µF	C47,57
		3	10	40644-01	CAPACITOR MET. POLYESTER .33µF	C20,21,44
		2	9	40643-01	CAPACITOR MET. POLYESTER .47µF	C56,58,17,18
		2	8	40642-01	CAPACITOR MET. POLYESTER .22µF	C53,55
		2	7	40641-01	CAPACITOR MET. POLYCARBONATE .47µF	C10,11
		2	6	40640-01	CAPACITOR CERAMIC 180pF	C2,4
			5	[illegible]	[illegible]	[illegible]
		3	4	103-0006-0680	CAPACITOR CERAMIC 68pF	C24,25,28
		2	3	40585-01	CAPACITOR TANTALUM 4.7µF	C62,63
		28	2	40580-01	CAPACITOR POLYESTER FILM .1µF	[illegible]
		1	1	41072-01	PRINTED CIRCUIT BOARD	

QTY REQD

RESISTOR PACK PREPARATION

1. FOR 648 "RN10"
   8 7 6 5 4 3 2 1 10 (FLUSH CUT PIN 10)
2. FOR 648 "RN11"
   8 7 6 5 4 3 2 1 10 (FLUSH CUT PIN 8 AND 10)

SOLDER PIN #3 OF RESISTOR PACK "RN10" TO PIN 16 OF U42; PIN #8 TO PIN 17 (U42); PIN #7 TO PIN 16 (U42); PIN #6 TO PIN 15 (U42); PIN #5 TO PIN 14 (U42); PIN #4 TO PIN 13 (U42); PIN #3 TO PIN 2 (U42); PIN #2 TO PIN 11 (U42);

SOLDER PIN #9 OF RESISTOR PACK "RN11" TO PIN 8 OF U43; PIN #7 TO PIN 6 (U43); PIN #6 TO PIN 15 (U43); PIN #5 TO PIN 14 (U43); PIN #4 TO PIN 13 (U43); PIN #3 TO PIN 12 (U43); PIN #2 TO PIN 11 (U43).

MAKE JUMPER WIRE BETWEEN PIN #1 OF RESISTOR PACK "RN11" (RN10 AND SOLDER [illegible]

CAUTION: ANTI-STATIC HANDLING REQUIRED

4. FOR JUMPER SCHEDULE SEE SHEET 3 OF 4
5. PLACE R73 (ITEM #126) FROM U29, PIN 1 TO U29, PIN 3 - SLEEVE AND INSULATE R73 LEADS.
2. COAT ASSY 41073-01 WITH 40201-00 PER SPEC NO. 49701-00
1. MAX. LEAD TRIM LENGTH .050".

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE

E.BEITZERMAN 7/24/87

DO NOT SCALE DRAWING

COMMUNICATIONS TECHNOLOGY

RTS MLT-I BOARD I
ASSEMBLY DRAWING

SIZE D | 41073 | -01 | AD

SCALE 2/1 | WT | SHEET 1 OF 4

AB 41073-01

IMPORTANT — PLEASE READ
(c) This Document contains proprietary design rights of COMMUNICATIONS TECHNOLOGY CORPORATION and all design, manufacturing, production, use of sales rights regarding the same are expressly reserved.
It is submitted for it stated purposes and recipient by acceptance of this document assumes custody and control and agrees: (a) this document will not be copied or reproduced in whole or part or otherwise disclosed in any manner to any person except to meet the specific purposes for which it was delivered and (b) that any specially fabricated structure in the design will not be manufactured with others.

REVISION BLOCK		
LET	REVISION	BY
	SEE SHEET 1	

			1	131	40577-01	CAPACITOR-120pF -200V-10%-CERAMIC	C7
			4	130	49129-01	JUMPER BLOCKS	$E_{3-4}, E_{5-6}, E_{7-8}, E_{9-10}$
		2.	1	129	40540-12	CAPACITOR-470pF-200VDC-1%-CERAMIC	C67
		2.	1	128	45000-16	RESISTOR-1.5MOHM-1/4W-5%	R75
		2.	1	127	45436-01	RES-442K-1/4W-1%-METAL FILM-RN55D	R74
		2.	1	126	0757-0278	RESISTOR FIXED-1.78KOHM-1/8W-1%	R73
			1	125	45339-01	RESISTOR CARBON FILM-4.3KOHM-1/4W-5%	R39
			2	124	40587-01	CAPACITOR TANTALUM 10 µF, 25V	C66, C65
			1	123	53261-01	T/R HARNESS	
			1	122	44227-01	ASSY-IC1013A/ADAPTOR 150 µV	U8
			1	121	44103-01	IC 1458	U7
			3	120	41671-01	PCB-DISCONNECT TAB..032 x.250 TAB	
			2	119	45802-01	RESISTOR PACK 100K,10 PIN,SIP	RN10,11
			1	118		CAPACITOR TBD	C3
			1	117	45343-01	VARISTOR $U_{22}ZA_6$	VR1
			1	116	45808-01	RESISTOR PACK 10 PIN,CUSTOM	RN9
			1	115	45807-01	RESISTOR PACK 10 PIN,CUSTOM	RN8
			1	114	45806-01	RESISTOR PACK 10 PIN,CUSTOM	RN7
			1	113	45805-01	RESISTOR PACK 10 PIN,CUSTOM	RN6
			1	112	45804-01	RESISTOR PACK 10 PIN,CUSTOM	RN5
			2	111	45803-01	RESISTOR PACK 10 PIN,CUSTOM	RN3,4
			4	110	41557-01	2 PIN HEADER	$E_{3-4}, E_{5-6}, E_{7-8}, E_{9-10}$
			5X1/2	109	41557-01	1 PIN HEADER	TP1-5
				108			
			4	107	47227-01	SPACER PAD-NYLON .281 DIA x.075 LG	Q1-4
			2	106	46536-01	TRANSISTOR 2N2905A	Q1,2
			2	105	46535-01	TRANSISTOR 2N2219A	Q3,4
			4	104	46533-01	TRANSISTOR VP0300M	Q5-8
			4	103	46532-01	TRANSISTOR VN2222LM	Q9-12
			1	102	45818-01	RESISTOR PACK 8 PIN 4-100K	RN1
			1	101	45809-01	RESISTOR PACK 8 PIN 4-10K	RN2
			1	100		RESISTOR TBD	R43
			1	99		RESISTOR TBD	R14
			1	98	0698-3449	RESISTOR METAL FILM 1% -1/8W-28.7K	R64
			1	97	45331-01	RESISTOR METAL FILM 1% -1/8W-1.24K	R63
			2	96	45330-01	RESISTOR METAL FILM 1% -1/8W-43.2K	R53,54
			2	95	45329-01	RESISTOR CARBON FILM 5% -1/4W-15 OHM	R31,34
			1	94		RESISTOR TBD	R8
			1	93	45327-01	RESISTOR METAL FILM 1% -1/8W-84.5K	R27
			2	92	0757-0346	RESISTOR METAL FILM 1% -1/8W-10 OHM	R6,13
			1	91	45325-01	RESISTOR METAL FILM 1% -1/8W-115K	R36
			1	90	0698-4471	RESISTOR METAL FILM 1% -1/8W-7.15K	R65
			1	89	45319-01	RESISTOR WIREWOUND 5% -3W-430 OHM	R9
			1	88	0683-1855	RESISTOR CARBON FILM 5% -1/4W-1.8M	R2
			1	87	45317-01	RESISTOR PRECISION TEMPERATURE 1K	R46
			2	86	45311-01	RESISTOR METAL FILM 1% -1/4W-1.5K	R17,19
			2	85	45423-01	RESISTOR METAL FILM .25% -3/4W-100K	R7,16
			1	84	45291-01	RESISTOR METAL FILM 1% -1/8W-33.2K	R26
			1	83	45275-01	RESISTOR METAL FILM 1% -1/8W-24.9K	R49
			1	82	45272-01	RESISTOR METAL FILM 1% -1/8W-4.02K	R4
			1	81	45264-01	RESISTOR METAL FILM 1% -1/8W-60.4K	R62
-03	-02	-01	ITEM NO.		PART NUMBER	DESCRIPTION	REF. DES.
QTY. REQ'D							

			1	80	45253-01	RESISTOR METAL FILM 1% -1/8W-40.2K	R1
			3	79	45244-01	RESISTOR METAL FILM 1% -1/8W-200K	R15,18
			1	78	45334-01	RESISTOR METAL FILM 1% -1/2W-402 ohm	R5
			1	77	45149-01	RESISTOR CARBON FILM 5% -1/4W-2K	R40
			1	76	45107-01	RESISTOR METAL FILM 1% -1/8W-4.99K	R59
			2	75	45100-21	RESISTOR METAL FILM 1% -1/8W-100K	R32,33
			2	74	45100-28	RESISTOR METAL FILM 1% -1/8W-23.7K	R52,55
			2	73	45100-17	RESISTOR METAL FILM 1% -1/8W-10K	R37-38
			1	72	45100-09	RESISTOR METAL FILM 1% -1/8W-1K	R57
			1	71	45100-19	RESISTOR METAL FILM 1% -1/8W-20K	R48
			1	70	45060-01	RESISTOR CARBON FILM 5% -1/4W-10M	R41
			2	69	45000-33	RESISTOR CARBON FILM 5% -1/4W-68K	R44,70
			1	68	45000-09	RESISTOR CARBON FILM 5% -1/4W-22K	R58
			4	67	45146-01	RESISTOR CARBON FILM 5% -1/4W-470ohm	R11,12,
			6	66	45158-01	RESISTOR CARBON FILM 5% -1/4W-100K	R10,20
			4	65	45000-02	RESISTOR CARBON FILM 5% -1/4W-10K	R42,45
			1	64	45000-01	RESISTOR CARBON FILM 5% -1/4W-1K	R68
			1	63	45946-01	POTENTIOMETER BECKMAN 10 TURN 500ohm	R47
			1	62	45945-01	POTENTIOMETER BECKMAN 10 TURN 500K	R50
			1	61	45944-01	POTENTIOMETER BECKMAN 10 TURN 1K	R30
			3	60	45943-01	POTENTIOMETER BECKMAN 10 TURN 5K	R28,29
			1	59	45942-01	POTENTIOMETER BECKMAN 10 TURN 100ohm	R21
			1	58	45941-01	POTENTIOMETER BECKMAN 10 TURN 10K	R3
			2	57	45316-01	POSISTOR 56 OHM MURATA	R66,67
			4	56	44527-01	RELAY DS1E-ML2-DC12V	K1-3,1
			10	55	44526-01	RELAY DS2E-ML2-DC12V	K4-13
			1	54	44219-01	IC 79L05	U37
			1	53	44218-01	IC 4538	U38
			1	52	44217-01	IC ULN2804	U6
			1	51	44216-01	IC MC1403	U10
			1	50	44215-01	IC AD7528JN	U29
			1	49	44214-01	IC 536 RMS TO DC CONVERTER	U36
			1	48	44213-01	IC HI1-5041CPE	U9
			1	47	44212-01	IC RS609	U24
			1	46	44211-01	IC RS621	U3
			4	45	44226-01	ASSY-IC1013/ADAPTOR 300µV	U15,35,
			3	44	44209-01	IC LT1008	U1,2,4
			3	43	44225-01	IC LT442	U5,11,2
			1	42	44207-01	IC 74HC4040	U22
			1	41	44206-01	IC 4536	U33
-03	-02	-01	ITEM NO.		PART NUMBER	DESCRIPTION	REF.
QTY. REQ'D							

NOTES UNLESS OTHERWISE SPECIFIED

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE
FRACTIONS : DECIMALS .XX : .XXX : ANGLES :
MATERIAL
FINISH
ERC SPEC NO
NEXT ASSY

DRAWN E.BEIZERMAN DATE 7/25/8
CHECKED
APPROVED
APPROVED
DO NOT SCALE DRAWING
MACHINE FINISH

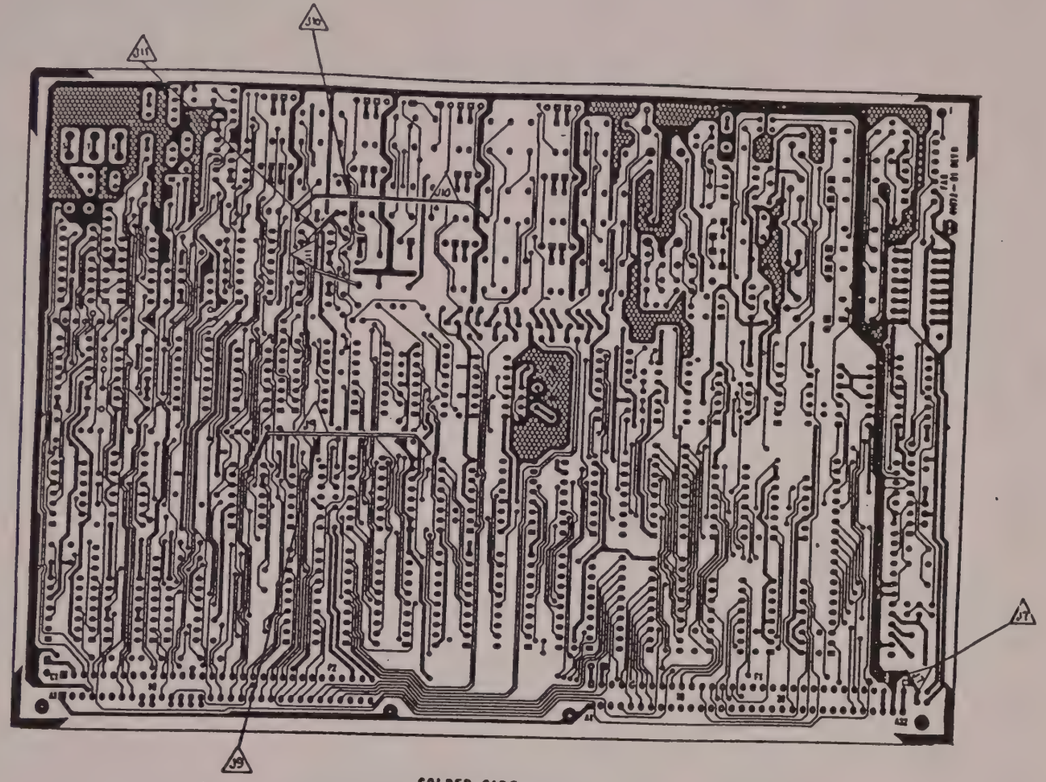
COMMUNICATIONS TECHNOLOGY

RTS MLT-1 BOARD
ASSEMBLY DRAWING

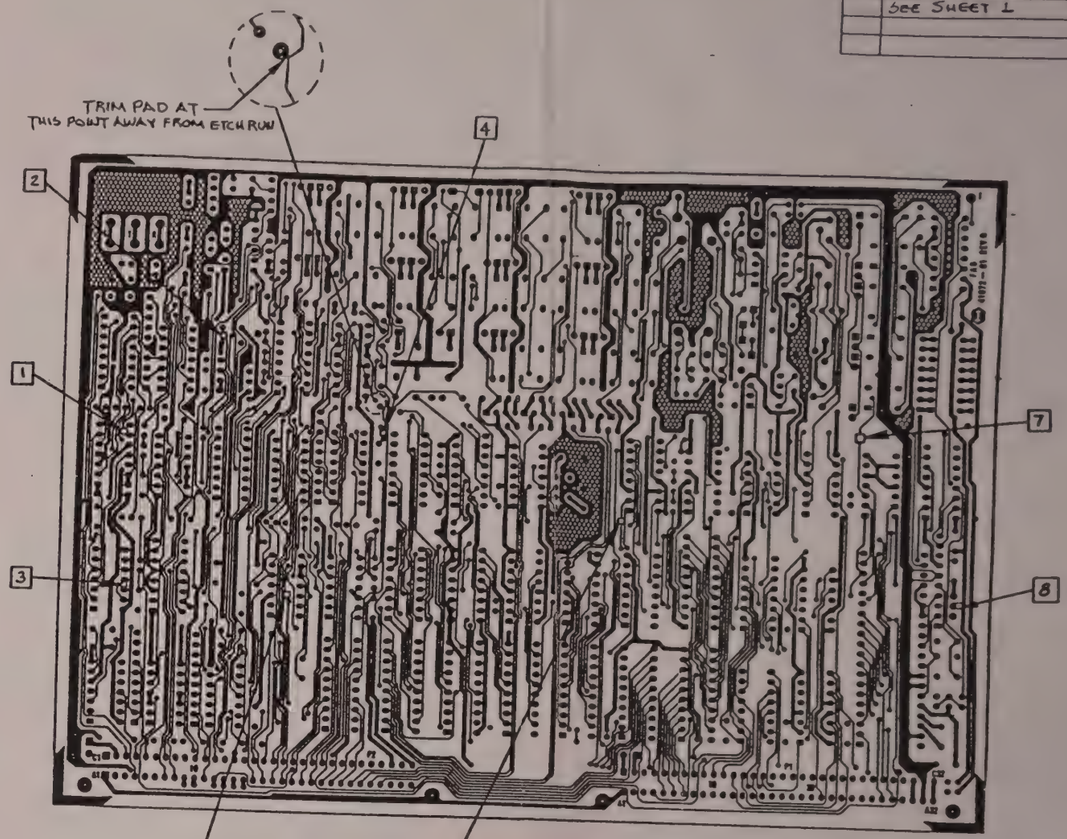
UNLESS OTHERWISE SPECIFIED REMOVE BURRS AND BREAK SH
SCALE NONE SIZE D 41073

CORPORATION, AND ITS AFFILIATES, OWNS ALL RIGHTS, TITLES AND INTERESTS IN AND TO THE INFORMATION CONTAINED HEREIN, INCLUDING ALL COPYRIGHTS, TRADE SECRETS, PATENTS AND OTHER INTELLECTUAL PROPERTY RIGHTS. THIS DRAWING IS THE PROPRIETARY PROPERTY OF COMMUNICATIONS TECHNOLOGY CORPORATION, AND ITS AFFILIATES, AND IS LOANED SUBJECT TO AGREEMENT THAT NO COPY OR REPRODUCTION SHALL BE MADE, IN WHOLE OR IN PART, WITHOUT THE PRIOR WRITTEN PERMISSION OF COMMUNICATIONS TECHNOLOGY CORPORATION, AND ITS AFFILIATES, AND THAT NO INFORMATION SHALL BE DISCLOSED EXPRESSLY OR IMPLIEDLY EXCEPT AS AUTHORIZED IN WRITING BY COMMUNICATIONS TECHNOLOGY CORPORATION, AND ITS AFFILIATES. THIS DRAWING SHALL BE RETURNED TO COMMUNICATIONS TECHNOLOGY CORPORATION, AND ITS AFFILIATES, UPON REQUEST.

REVISION BLOCK			
LET	REVISION	BY	D
	SEE SHEET 1		



SOLDER SIDE



SOLDER SIDE

SEE NOTE: 3

JUMPER SCHEDULE/COMPONENT/SOLDER SIDE OF PCB	
SYM	DESCRIPTION
J11	U6, PIN 9 TO P1, C29 (COMPONENT SIDE SHT. 1 OF 4)
J10	RN10, PIN 1 TO RN11, PIN 1 TO U43, PIN 10 (COMP. SIDE)
J9	U24, PIN 6 TO FEED THRU AS SHOWN (COMP. SIDE)
J8	U24, PIN 5 TO U23, PIN 4 (COMP. SIDE)
J7	U39, PIN 11 TO C41 UPPER PIN (COMP. SIDE)
J6	U39, PIN 12 TO U36 PIN 1 (COMP. SIDE)
J5	E13 TO E13 TO GND (SOLDER SIDE THIS SHT.)
J4	U16, PIN 2 TO U43, PIN 13 (COMP. SIDE)
J3	U33 TO U36 FEED THRU AS SHOWN (SOLDER SIDE)
J2	K11, PIN 13 TO K9, PIN 13 (SOLDER SIDE)
J1	K11, PIN 9 TO K14, PIN 12 (SOLDER SIDE)
J0	U37, PIN 2 TO P1, C30 (COMP. SIDE)
J12	U12, PIN 3 TO U12 PIN 5 (COMP. SIDE)
J13	U23, PIN 5 TO U9, PIN 10 (COMP. SIDE)

CUT SCHEDULE/SOLDER SIDE OF PCB	
SYM	DESCRIPTION
1	U24, PIN 6 AT PAD
2	C21, ETCH AT TOP PAD OPPOSITE GND SIDE
3	U39, PIN 12 FROM U39, PIN 11
4	U29, PIN 19 FROM P2, C19
5	U39, PIN 6 FROM U46, PIN 15
6	U16, PIN 2
7	U12, PIN 3 FROM U34 PIN 2
8	U37, PIN 2

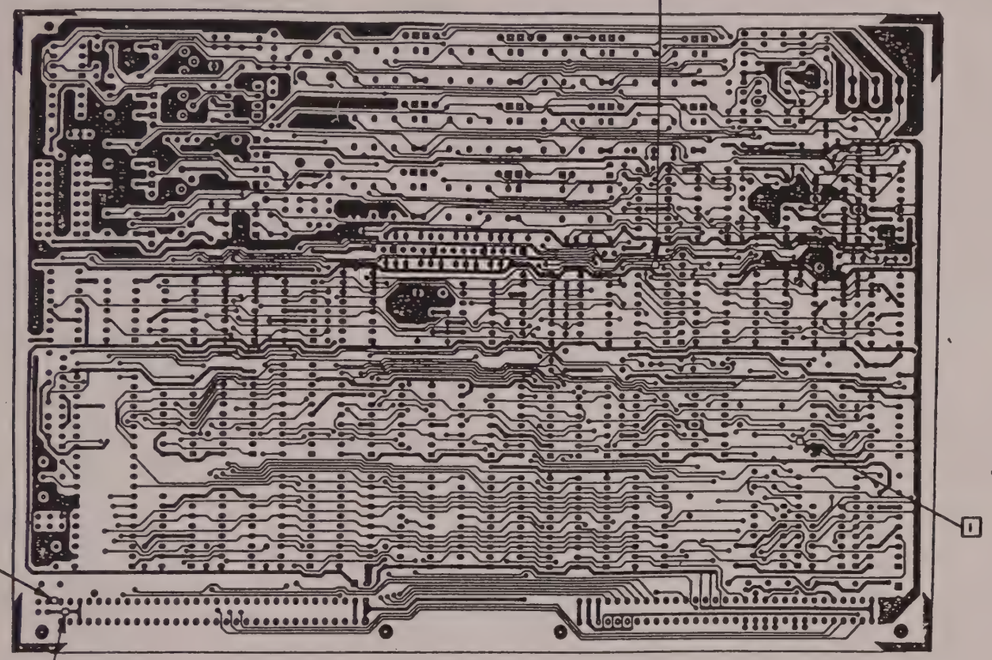
3. USE 28 GA SOLID - KYNAR INSULATED WIRE FOR JUMPERS
2. SECURE JUMPERS TO PCB AS NEEDED WITH BONDING AGENT, DO NOT APPLY ON SOLDER JOINTS.
1. STRAIN RELIEF ALL JUMPERS - ROUTING OF JUMPERS PICTORIAL ONLY, DO NOT ROUTE OVER SOLDER JOINTS.

NOTES: UNLESS OTHERWISE SPECIFIED

QTY REQ'D	ITEM NO.	PART NUMBER	DESCRIPTION
UNLESS OTHERWISE SPEC'D DIMENSIONS ARE IN INCHES TOLERANCES ARE FRACTIONS ± DECIMALS .XX ± .XXX ± ANGLES ±		DRAWN JMS. DATE 12-27-88 CHECKED / ENGINEER APPROVED	COMMUNICATIONS TECHNOLOGY
MATERIAL CTC SPEC NO		APPROVED DO NOT SCALE DRAWING	RT5 MLT-1 BOARD 1 ASSEMBLY DRAWING
FINISH MACHINE FINISH			UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES

IMPORTANT — PLEASE READ
This Document discloses proprietary design rights of COMMUNICATIONS TECHNOLOGY CORPORATION and all design, manufacturing, production, use of same rights regarding the same are hereby reserved.
Submitted for a specific purpose and received by acceptance of this document assumes these rights. Neither this document nor the information contained herein is to be reproduced or copied in whole or in part, or used or disclosed for any purpose except as specifically authorized in writing by COMMUNICATIONS TECHNOLOGY CORPORATION. If this document is returned upon request, all copies must be returned and all rights terminated.

REVISION BLOCK				
LET	REVISION	BY	DATE	CHK
	SEE SHEET 1			



COMPONENT SIDE

CUT SCHEDULE / COMPONENT SIDE OF PCB	
SYM	DESCRIPTION
1	U39, PIN 12 FROM C46 UPPER PIN
2	P1, PIN C32 FROM E13
3	P1, PIN C30, A30 FROM E15
4	U29, PIN 19 FROM P2, C19

S UNLESS OTHERWISE SPECIFIED

QTY. REQ'D.	ITEM NO.	PART NUMBER	DESCRIPTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS DECIMALS ANGLES
.XX
.XXX

DRAWN J.M.S DATE 12-27-77
CHECKED
APPROVED
APPROVED
MATERIAL
FINISH
DO NOT SCALE DRAWING
NEXT ASSY

COMMUNICATIONS TECHNOLOGY

RTS MLT-1 BOARD 1
ASSEMBLY DRAWING

UNLESS OTHERWISE SPECIFIED REMOVE BURRS AND BREAK SHARP EDGES

SCALE None SIZE D 41073 DASH NO -01 REV AP

IMPORTANT - PLEASE READ
This Document contains proprietary design rights of COMMUNICATIONS TECHNOLOGY CORPORATION and all design, manufacturing, production, use of sales rights regarding the devices and/or equipment described herein are reserved. Acceptance of this document constitutes agreement that no part of this document will be reproduced or copied in whole or part, or disclosed to others, or used for manufacturing purposes without written permission from COMMUNICATIONS TECHNOLOGY CORPORATION, and that the information contained in this document will be held in confidence.

FREQUENCY SOURCE

P2-A18
F
F/2
P2-C12
R41 1M
HCU04 U17
C26 .1
R48 2K
Y1 3.579545MHZ
C25 68PF
C24 68PF
HC 4020 U18
A/D CK 223.7KHZ → U26,22 SHEET 5
U19 4046
C28 68PF
R44 68K
R70 68K
C27 1.0
C64 1.0
R42 16K
R43
5089 U34
STI → P2-C11
DTMF → P2-C22
CHIP DIS
RCO
OSC OUT
AC/DC → P2-C16
U18.2 SHEET 5 → +2.5VR
DG303 U14
DATA BUS
SINE OUT
AD7528 U29
R74 44.2K
C67 470PF
R75 LSB
AUDIO B → P2-C19
AUDIO B → P2-C23
AUDIO → P2-A22
U27.11 DB/RB
U12.12 W7
U27.4 WRITE
SHEET 4

4526 U30
4526 U31
4526 U32
4538 U33

SINE WAVE CONVERTER

R51 16K
SD CK → U3,12 SHEET 2
4040 U22
4078 U21
RF IN
4051 U20
RN6 2.87K 4.53K 2.88K 1.62K 12.7K 7.32K 26.1K 93.1K
RN2 10K
RN6 8.75K
+5VR
-5VR
HC74 U23
4538 U38
R56 5K
R64 28.7K
C47 .1
HCU04 U17
R45 10K
U24 5589
U5 442
C19 .1
R54 43.2K
R55 23.7K
C30 .0022
U25 442
C29 .001
C31 .1
U39 DG303
TONE CL26
U9,10 SHEET 2
U9,15 SHEET 2
SHEET 4
SINE OUT
R73 1.78K
R39 4.3K
U15 1013
C23 .1
R38 10K
R37 10K
VSA U2,3 SHEET 2
VSB U4,3 SHEET 2
U13

D/A CONVERTER

1. ⏚ IS DIGITAL GND, ⏚ IS ANALOG GND.

NOTES: UNLESS OTHERWISE SPECIFIED

REVISION BLOCK

LET	REVISION	BY	DAT
P3	INITIAL RELEASE PER EN 6353	E.B.	6/26/
P4	REVISED PER EN 6399	E.B.	7/18/
P5	REVISED PER EN 6457	E.B.	8/24/
P6	REVISED PER EN 6566	E.B.	11/26/
P7	REVISED PER EN 6889	E.B.	3-15-8
P8	REVISED - EN 7009	S.S.	4-14-8
N/C	REVISED PER EN 7026	E.B.	4-28-8
A	REVISED PER EN 7282	WDY	8-8-8
B	REVISED PER EN 7352	E.B.	10-8-
C	REVISED PER EN 7497	E.B.	1-15-
D	REVISED - EN 8242	S.L.	11-24-
E	REVISED EN 8499	E.B.	2-28-
F	REVISED - EN 8911	S.L.	3-14-8
G	REVISED - ECN D1585	KDS.	2-4-9

ITEM NO.	QTY. REQ'D.	PART NUMBER	DESCRIPTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE
FRACTIONS ± DECIMALS ± ANGLES ±
MATERIAL
CTC SPEC #D

DRAWN	E.BEIZERMAN	DATE 6/25/84
CHECKED		
APPROVED	B.H.	6-26-84
APPROVED	C.WAAS	6/26/84

DO NOT SCALE DRAWING

COMMUNICATIONS TECHNOLOGY

REPAIR TEST SET
MLT-1 BOARD 1 SCHEMATIC DIAGRAM

THE INFORMATION CONTAINED HEREIN IS THE PROPRIETARY PROPERTY OF COMMUNICATIONS TECHNOLOGY CORPORATION AND IS FURNISHED FOR REFERENCE ONLY. ALL RIGHTS RESERVED. NO PART OF THIS DOCUMENT MAY BE REPRODUCED, DISCLOSED OR USED IN ANY MANNER WITHOUT THE EXPRESS WRITTEN PERMISSION OF COMMUNICATIONS TECHNOLOGY CORPORATION.

REVISION BLOCK			
LET	REVISION	BY	DATE
	SEE SHEET 1 OF 5		

ADMITTANCE CIRCUIT

SYNCHRONOUS DETECTOR

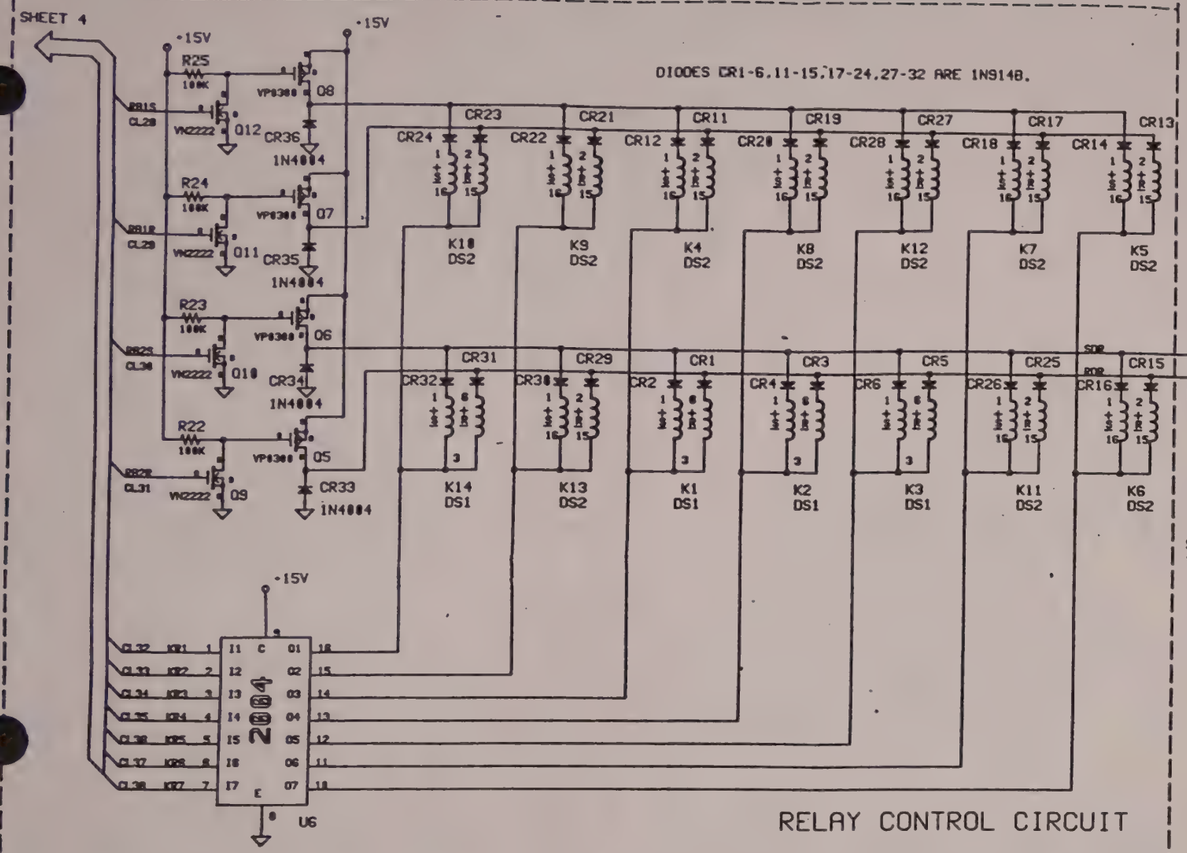
AC HIGHPASS FILTER

BESSEL LOW PASS FILTER

NOTES: UNLESS OTHERWISE SPECIFIED

QTY. REQ'D.	ITEM NO.	PART NUMBER	DESCRIPTION
		E.BEIZERMAN 6/11/9	COMMUNICATIONS TECHNOLOGY
		DO NOT SCALE DRAWING	REPAIR TEST SET MLT-1 BOARD 1 SCHEMATIC DIAGRAM
			SCALE NONE SIZE D 81077 DASH NO -99

LET	REVISION	BY	DATE	CHK
	SEE SHEET 1 OF 5			



IC PIN POWER AND GROUND TABLE

IC NO.	PACKAGE	+5V	-5V	+5VR	+15V	-15V	+10V	-10V	D-GND	A-GND
U1	LT1080				7	4				
U2	LT1080				7	4				
U3	RS821						14	1		3
U4	LT1080				7	4				
U5	LF442				8	4				
U6	ULN2804				9				8	
U7	LM1458N				8	4				
U8	LT1013N				8	4				
U9	IH5041	12			11	14			13	
U10	MC1403N	1								3
U11	LF442				8	4				
U12	74HCU04	14							7	
U13	DG303				14	8			7	
U14	DG303				14	8			7	
U15	LT1013				8	4				
U16	DG508				13	3			14	
U17	74HCU04	14							7	
U18	74HC4020	16							8	
U19	4046	16							8	
U20	4051	16						7	8	
U21	4079	14							7	
U22	74HC4020	16							8	
U23	74HC74			14					7	
U24	RS689						5	1.6		7
U25	LF442				8	4				
U26	7109	40	28						1	33
U27	74HC30	14							7	
U28	74HC138	16							8	
U29	RO7528	17							5	
U30	4526	16							8	
U31	4526	16							8	
U32	4526	16							8	

IC NO.	PACKAGE	+5V	-5V	+5VR	+15V	-15V	+10V	-10V	D-GND	A-GND
U33	4536	16							8	
U34	5089	1							6	
U35	LT1013				8	4				
U36	RO536				14	3				
U37										
U38	4538	16							8,1,15	
U39	DG303				14	8			7	
U40	74HC85	16							8	
U41	74HC138	16							8	
U42	74HC245	20							10	
U43	74HC245	20							10	
U44	74HC273	20							10	
U45	74HC273	20							10	
U46	74HC273	20							10	
U47	74HC273	20							10	
U48	74HC273	20							10	
U49										
U50	LT1013				8	4				
U51	DG303				14	8			7	
U52	LT1013				8	4				
U53	79L05					1			3	

NOTES: UNLESS OTHERWISE SPECIFIED

ITEM NO.	QTY. REQ'D.	PART NUMBER	DESCRIPTION
		E.BEIZERMAN 6/11/84	COMMUNICATIONS TECHNOLOGY
		DO NOT SCALE DRAWING	REPAIR TEST SET MLT-1 BOARD 1 SCHEMATIC DIAGRAM

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ARE: FRACTIONS ±; DECIMALS .XX ±, .XXX ±; ANGLES ±. MATERIAL: CTC SPEC NO. FINISH. MACHINE. REMOVE BURRS AND BREAK SHARP EDGES. SCALE. WEIGHT. SIZE. SHEET OF.

DRAWING NO. F 4073-22 C

B

D

...COMMUNICATIONS TECHNOLOGY... reproduced in whole or in part, or its contents disclosed to others without the written consent of COMMUNICATIONS TECHNOLOGY...

REVISION BLOCK				
LET	REVISION	BY	DATE	CHK
	SEE SHEET 1 OF 5			

CIMBUS INTERFACE

SHEETS 1 AND 3

U40 74HC85 · U41 74HC138 · U42 74HC245 · U43 74HC245 · U44 74HC273 · U45 74HC273 · U46 74HC273 · U47 74HC273 · U28 74HC138 · U12 74HCU04 · U27 74HC08

P1-A28 P1-C15 P1-C14 P1-C13 P1-C12 P1-A7 P1-A6 P1-A5 P1-A4 P1-C7 P1-C6 P1-C5 P1-C4 P1-A21 P1-A27 P1-C11 P1-C10 P1-C9 P1-C8 P1-C27

·5V

CLEAR · PWRUP · READ · WRITE · STAT · DA/PB · AD-HI/LO

U29.15 SHEET 1 · U26.28 SHEET 5 · U29.16 SHEET 1 · U26.2 SHEET 5 · U29.6 SHEET 1 · U12.1 · U29.18 SHEET 5

·15V C65 10 E15 E14 · C66 10 E13 E12 · C63

P2-A32 P2-C32 · P2-A31 P2-C31 · P2-A30 P2-C30 · P2-A2 P2-C2 · P2-A1 P2-C1

C41 C62 C48 C49 C50 C51 .1 · P1-A2 P1-C2 · P1-A1 P1-C1

P2-A20 P2-C20 P2-A19 P2-A24 P2-A22 P2-A25 P2-A23 P2-C21 P2-A28 P2-A26 P2-C28 P2-C27 P2-A29 P2-A27 P2-C29 P2-C26 P2-A12,C12 P2-A11 P2-C16 P2-C18 P2-C15 P2-A5 P2-A6 P2-A3 P2-C24

ITEM NO.	QTY. REQ'D.	PART NUMBER	DESCRIPTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE FRACTIONS DECIMALS ANGLES

E. BEIZERMAN 6/11/84

DO NOT SCALE DRAWING

NEXT ASSY

COMMUNICATIONS TECHNOLOGY

REPAIR TEST SET

MLT-1 BOARD 1 SCHEMATIC DIAGRAM

SCALE NONE

41073-22 C

D

ES. UNLESS OTHERWISE SPECIFIED

IMPORTANT - PLEASE READ
This Document contains proprietary design rights of COMMUNICATIONS TECHNOLOGY CORPORATION and all design, manufacturing, production, use of these rights regarding the same are expressly reserved.
It is submitted for a specific purpose, and recipient by acceptance of this document agrees that neither it nor any information disclosed herein will be reproduced in whole or part, or be used, disclosed or in any manner to any person except to meet the stated purpose for which it was delivered and with their expressed written consent, and that no rights are granted to make or sell the apparatus or systems disclosed herein or to use any drawing, sketch or specification not prepared by it.

REVISION BLOCK				
LET	REVISION	BY	DATE	CHK
	SEE SHEET 1 OF 5			

RMS To dB/DC CONVERTER

A/D CONVERTER

U39,12 SHEET 2 AC OUT

U39,11 SHEET 2 MI

+2.5VR

+15V C44 .33

C46 1

536 U36

C43 1

C45 .001

-15V

R50 500K

R49 24.9K

U35 1013 U16,6 SHEET 2 VRMS

+15V C42 .1

-15V

U52,6 SHEET 2 LPF

RN7 4.99K

RN7 1M

RN7 2.49K

C38 .01

RN7 499K

C37 .047 C36 .047

+10VR U7,3 SHEET 2

RN7 30K

442 U11

RN7 10K

R59 4.99K R58 22K

R57 1K C39 1

U18,7 SHEET 1 A/D CK 223.7KHZ

C40 1

7109

+5V -5V

IN HI, IN LO, COM, BUF, AZ, INT, REF IN+, REF IN-, MODE, OSC SEL, OSC IN, SEND, REF C+, REF C-, B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12, OR, POL, STRT, RUN/HOLD, TEST, CE, LBEN, HBEN

D.0 D.1 D.2 D.3 D.4 D.5 D.6 D.7 DATA BUS

U43,17 SHEET 4

U12 HCU04 READ U27,3 SHEET 4

U26

U12 HCU04 AD HI/LO U27,11 SHEET 4

-15V 79L05 -5V U37 C35 .1

U12 HCU04 (x3)

R62 68.4K

R46 P 1K

R47 500

R48 20K

U35 1013 U16,5 SHEET 2

R63 1.24K

+5VR SHEET 1

U14,3 SHEET 1 +2.5VR

1403A U18

C34 .1

442 U11

RN7 10K

RN7 10K

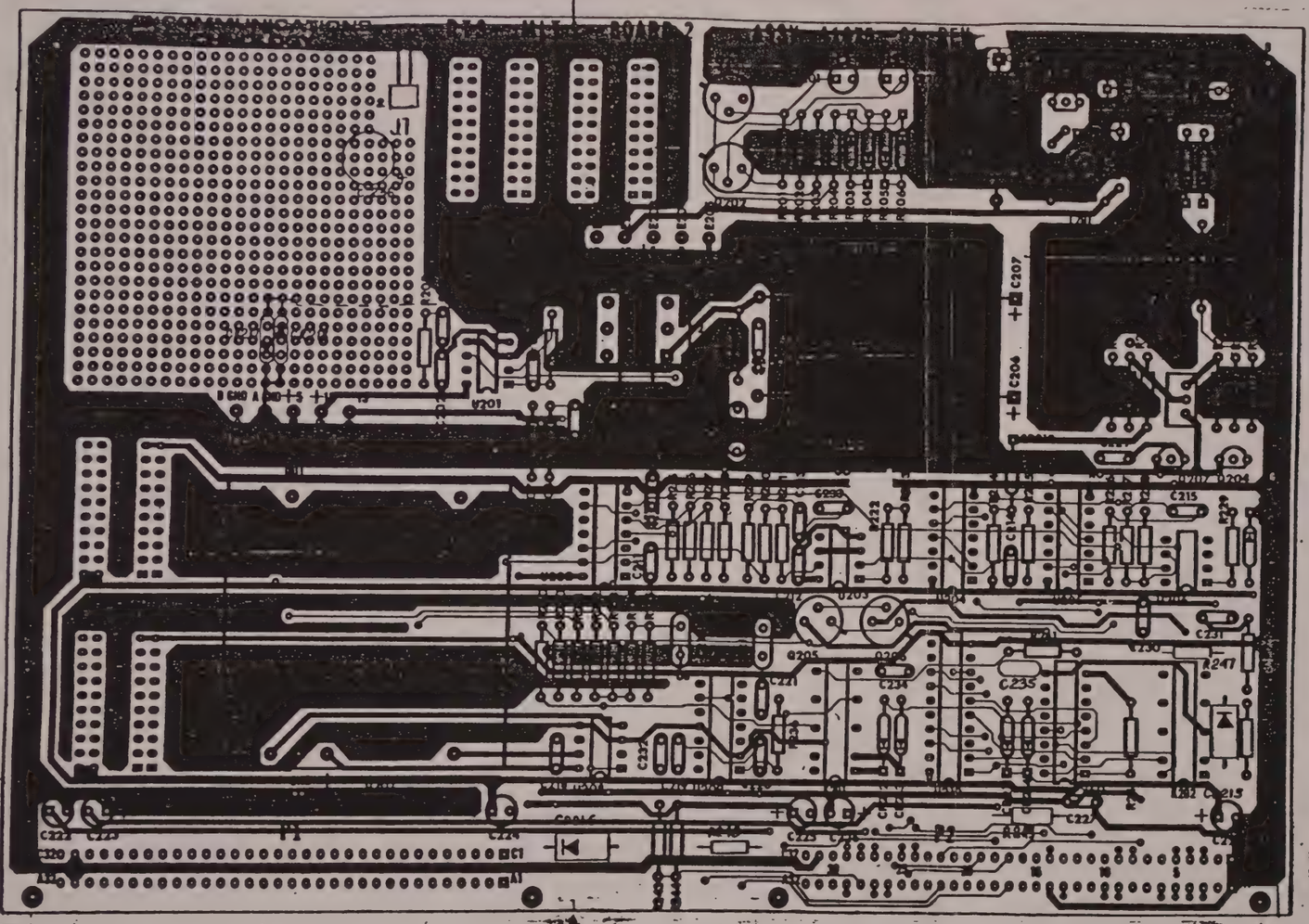
QTY. REQ'D.	ITEM NO.	PART NUMBER	DESCRIPTION
		E.BEIZERMAN 6/11/8	COMMUNICATIONS TECHNOLOGY
			REPAIR TEST SET
		DO NOT SCALE DRAWING	MLT-1 BOARD 1 SCHEMATIC DIAGRAM
NEXT ASSY			SCALE NONE SIZE D 41873 -22 REV E

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE FRACTIONS DEC MKS ANGLES

NOTES: UNLESS OTHERWISE SPECIFIED

F: 27873-22 C

IMPORTANT - PLEASE READ
(1) This Document contains proprietary design rights of COMMUNICATIONS TECHNOLOGY CORPORATION and all design, manufacturing, production, use of items, rights regarding the same are expressly reserved.
It is submitted for a specific purpose and pursuant to acceptance of this document assumes such and agrees and agrees (a) this document will not be copied or reproduced in whole or part or be otherwise disclosed or in any manner to any person except to meet the specific purpose for which it was submitted and (b) that any such disclosure shall be made to the employees of the recipient who need to know such information and who are informed of and agree to be bound by the obligations contained herein.



6	7	8

REVISION BLOCK			
LET	REVISION	BY	DA
	SEE SHEET 1 OF 2		

			1	93	1910-0016	DIODE - GERMANIUM	CR220
4			1	92	42002-02	DIODE - ZENER - 1N751A	CR219
			1	91	45248-01	RESISTOR - 18.2K - 1% - 1/8W - MF	R253
3			1	90	40588-01	CAPACITOR - 33μF - 10V - 10% - TANT	C238
			1	89	44049-01	IC - 386 - AUDIO AMPLIFIER	U212
			1	88	41211-01	INDUCTOR - 2.18MH - CUSTOM	L202
2			1	87	45437-01	RESISTOR - 56 OHM - 1/2W - 1% - METAL FILM	R252
			1	86	45000-32	RESISTOR - 47KOHM - 1/8W - 5% - CARBON FILM	R251
			1	85	40638-01	CAPACITOR - 62PF - 20V - 10% - CERAMIC	C237
1			2	84	45100-09	RESISTOR - RN55D - 1KOHM - 1%	R223,250
			1	83	45195-01	RESISTOR - 200KOHM - 1/4W - 1% - MF	R237
			4	82	47227-01	SPACER PAD, NYLON, .281 DIA X .075 LG.	Q201,202,20
			1	81	40702-01	CAPACITOR - 100μF - 16V - 20% - ALUM	C236
			1	80	40519-01	CAPACITOR CERAMIC 200V 100pF	C235
			1	79	45343-01	VARISTOR U_{mZA}	VR201
1			1	78	45117-01	RESISTOR - 10K OHM - 1/4W - 1% - MF - RN55D	C213
				77			
				76			
			2	75	46537-01	TRANSISTOR MPS-A93	Q203,204
			1	74	46536-01	TRANSISTOR 2N2905A	Q201
			1	73	46535-01	TRANSISTOR 2N2219A	Q202
			1	72	46532-01	TRANSISTOR VN2222LM	Q207
			1	71	48013-01	TRANSFORMER 671-8316	T201
			1	70	45341-01	RESISTOR METAL FILM 1% - 1/8W - 54.9K	R218
			1	69	45340-01	RESISTOR CARBON FILM 5% - 1/4W - 680ohm	R241
				-			R219
			1	67	45338-01	RESISTOR METAL FILM 1% - 1/4W - 100K	R214
			1	66	45337-01	RESISTOR CARBON FILM 5% - 1/4W - 62K	R229
			1	65	45336-01	RESISTOR METAL FILM 1% - 1/8W - 150K	R233
			1	64	45333-01	RESISTOR METAL FILM 1% - 1/8W - 619 ohm	R209
			1	63	45330-01	RESISTOR METAL FILM 1% - 1/8W - 43.2K	R216
			1	62	45253-01	RESISTOR METAL FILM 1% - 1/8W - 49.2K	R206
			1	61	45247-01	RESISTOR METAL FILM 1% - 1/8W - 392K	R232
			1	60	45243-01	RESISTOR METAL FILM 1% - 1/8W - 1M	R213
			1	59	45237-01	RESISTOR METAL FILM 1% - 1/8W - 12.7K	R234
			1	58	45160-01	RESISTOR CARBON FILM 5% - 1/4W - 200K	R228
							R236
			1	56	45127-01	RESISTOR METAL FILM 1% - 1/8W - 11K	R242
			1	55	45119-01	RESISTOR METAL FILM 1% - 1/8W - 82.5K	R205
			2	54	45112-01	RESISTOR METAL FILM 1% - 1/8W - 100K	R238,246
			1	53	45106-01	RESISTOR METAL FILM 1% - 1/8W - 9.09K	R212
			1	52	45100-19	RESISTOR METAL FILM 1% - 1/8W - 20K	R244
			5	51	45100-17	RESISTOR METAL FILM 1% - 1/8W - 10K	R207,208,210, ,231
			1	50	45100-14	RESISTOR METAL FILM 1% - 1/8W - 3.83K	R235
			1	49	45100-12	RESISTOR METAL FILM 1% - 1/8W - 2K	R217
			1	48	45000-25	RESISTOR CARBON FILM 5% - 1/4W - 1.5K	R225
			2	47	45163-01	RESISTOR CARBON FILM 5% - 1/4W - 1M	R221,224
			2	46	45301-01	RESISTOR METAL FILM 1% - 1/4W - 124ohm	R203,204
				45			
			2	44	45000-11	RESISTOR CARBON FILM 5% - 1/4W - 150ohm	R201,202
			1	43	45000-06	RESISTOR CARBON FILM 5% - 1/4W - 3.3K	R220
			5	42	45158-01	RESISTOR CARBON FILM 5% - 1/4W - 100K	R227,239,245,247,2
			1	41	45000-03	RESISTOR CARBON FILM 5% - 1/4W - 2.2K	R211
-03	-02	-01	ITEM NO.		PART NUMBER	DESCRIPTION	REF. DES.
QTY. REQ'D.							

NOTES: UNLESS OTHERWISE SPECIFIED

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ARE
FRACTIONS DECIMALS ANGLES
.X ±
.XX ±
.XXX ±

MATERIAL
CTC SPEC NO

E.BEIZERMAN 7/31/84
CHECKED
APPROVED
APPROVED

DO NOT SCALE DRAWING

COMMUNICATIONS TECHNOLOGY

RTS MLT-1 BOARD 2
ASSEMBLY DRAWING

UNLESS OTHERWISE SPECIFIED REMOVE BURRS AND BREAK SHARP EDGES

SCALE 2/1 DATE

(1) This Document contains proprietary design rights of COMMUNICATIONS TECHNOLOGY CORPORATION and all design, manufacturing, production, and all other rights regarding this document and the equipment.
(2) It is furnished for a specific purpose and may not be reproduced, published or disclosed to others without prior written permission. Any reproduction of this document must include this notice. Recipient agrees (A) that this document and the information disclosed herein will not be published or disclosed to others, will not be used in any manner detrimental to the interests of COMMUNICATIONS TECHNOLOGY CORPORATION, and will not be used in the design of any product, except as authorized in writing by COMMUNICATIONS TECHNOLOGY CORPORATION.
IMPORTANT - PLEASE READ

IC PIN POWER AND GROUND TABLE

IC NO.	PACKAGE	+5V	-5V	+10V	-10V	+15V	-15V	D-GND	A-GND
U201	LF442								
U202	DG303								
U203	1458								
U204	4093								
U205	HC02								
U206	LF442								
U207	C-MESS 581-2								
U208	LF442								
U209	AD605								
U210	74HC273								
U211	ULN2004								

REVISION BLOCK

LET	REVISION	BY	DAT
P2	PROTO. RELEASE PER EN6353	E.B.	6/28/
P3	REVISED PER EN 6482	E.B.	7/18/
P4	REVISED PER EN 6457	E.B.	8/23/
P5	REVISED PER EN 6566	E.B.	10/30/
P6	REVISED PER EN 6764	E.B.	1/28/
P7	REVISED PER EN 6889	E.B.	3/25/
P8	REVISED PER EN 6970	E.B.	4/4/
P9	REVISED - EN 7362	SS	9/17/
P10	REVISED - EN 8242	S.L.	11-26-
P11	REVISED - EN 8441	S.L.	3-26-
P12	REVISED-EN 8663	SF	7-10-
N/C	INITIAL RELEASE - EN 8828	S.L.	12-12-
A	REVISED - EN 8929	S.L.	12-12-

AUDIO AND DTMF AMPLIFIERS

FREQUENCY TO VOLTAGE CONVERTER

-100V FLYBACK SUPPLY

NOISE/LEVEL/POWER INFLUENCE

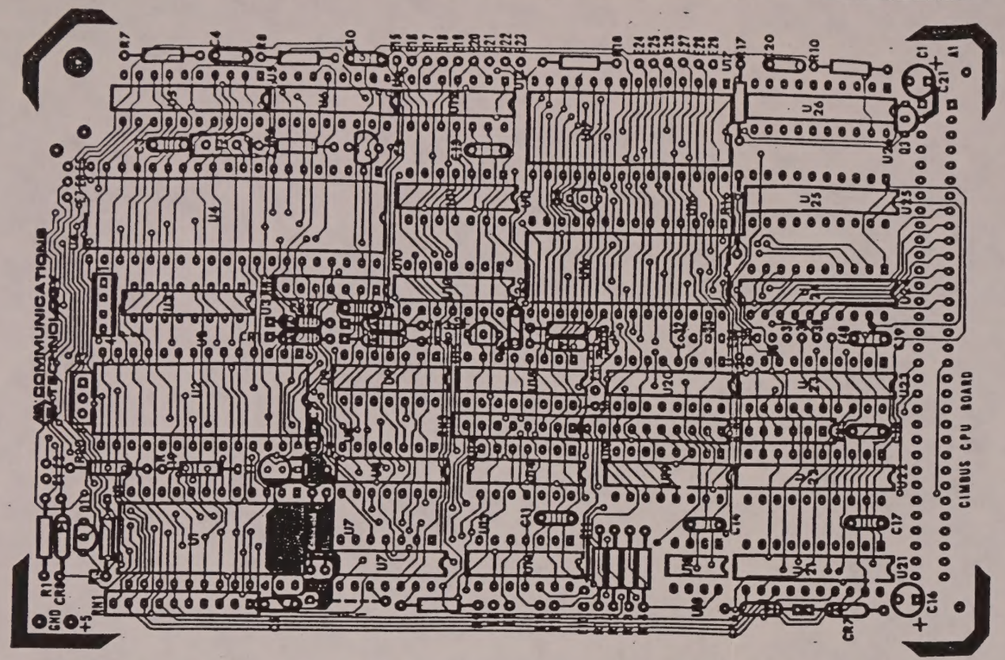
POWER AND RELAY CONTROL

2. L1-593 TURNS .56OHMS, NO. 36.
1. ⏚ IS DIGITAL GND. ⏚ IS ANALOG GND.

NOTES UNLESS OTHERWISE SPECIFIED

QTY. REQ'D.	ITEM NO.	PART NUMBER	DESCRIPTION
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE FRACTIONS DECIMALS ANGLES		DRAWN E.BEIZERMAN 6/25/84	COMMUNICATIONS TECHNOLOGY
		CHECKED	REPAIR TEST SET
		APPROVED	MLT-1 BOARD 2 SCHEMATIC DIAGRAM
MATERIAL		APPROVED C.WRAS 6/26/84	
DTC SPEC NO		DO NOT SCALE DRAWING	

IMPORTANT – PLEASE READ
(C) This Document contains proprietary design rights of COMMUNICATIONS TECHNOLOGY CORPORATION and all design manufacturing production use of same rights regarding the same are hereby reserved.
It is forbidden for (1) reading, purchase and negotiation of this document or the contents thereof, (2) unauthorized use or reproduction of this document and not be disclosed or reproduced in whole or part, or the contents thereof, or (3) any unauthorized use of this document or the information contained herein, and (4) the use of any manufacturing process of the design and not to be reproduced or used in whole or part.



REVISION BLOCK				
LET	REVISION	BY	DATE	CI
AH	REVISED AND REDRAWN EN 8577	E.B.	7-14-87	
AJ	UPDATE DOCUMENTATION ECO	JS	10-6-88	
AK	REVISED ECN 01323	JS	1-24-89	
AL	REVISED PER ECN 01472	J.S.	7-21-89	
AM	REVISED PER ECN 01518	J.S.	10-1-89	
AN	REVISED PER ECN 01569	P.B.	1-17-90	

CAUTION:
ANTI-STATIC HANDLING REQUIRED

-10	-09	-08	-07	-06	-05	-04	-03	-02	-01	QTY. REQ'D	LOCATION
			-	-	-	2	-	-	-		U114-6, U119-10
			1	1	1	-	-	-	-		RN2-6/RN2-7
			1	1	1	-	-	-	-		U3-9/U2-2
			1	1	1	-	-	-	-		U3- 2/U3-15
			1	1	1	-	-	1	-		SEE NOTE 2
			1	1	1	-	-	-	-		E36-37
			-	-	-	-	-	1	-		E35-36
			1	1	1	-	-	-	-		E33-34
			-	-	-	-	-	1	-		E32-33
			-	1	-	-	-	-	-		E30-31
			1	1	1	-	-	1	-		E28-29
			-	-	-	1	-	-	-		E27-28
			1	1	1	1	-	-	-		E25-26
			-	-	-	-	-	1	-		E24-25
			-	-	-	-	-	1	-		E22-23
			-	-	-	-	-	1	-		E18-19
			1	1	1	1	-	-	-		E16-17
			-	-	-	-	-	1	-		E15-16
			1	1	1	1	1	1	1		E10-11
			-	-	-	-	1	-	-		E6-7
			1	1	1	1	1	1	1		E5-6
			1	1	1	1	1	1	1		E1-2

WIRE JUMPER TABLE

(2) C14 IS NOT USED ON -04 ASSY.
7. SHOWN ARE: -02, -05, -06, -07.
6. USE REFERENCE DESIGNATORS IN THE ORDER LISTED, FOR EXAMPLE, IF 4 LOCATIONS ARE LISTED, BUT A GIVEN DASH NUMBER CALLS FOR 3 ITEMS, THE FIRST THREE REFERENCE DESIGNATORS APPLY.
5. MAX. LEAD TRIM LENGTH .050.
(4) ASSEMBLE TY-WRAPS TO U4 AND U16 WITH HEAD OF TY-WRAP AT THE SAME END AS PIN NO. 1 FOR -02 AND -04.
(3) SOLDER LEADS OF C22 TO OUTSIDE LEADS Q1 ON SOLDER SIDE ONLY FOR 5481-04.
2 BETWEEN RN2 AND U4 ARE 7 PADS, NUMBERED 1 THRU 7 FROM RIGHT TO LEFT. JUMPER IS FROM 6 TO 7. IN THE ABSENCE OF RN2 JUMPER PINS 6 & 7.
1. WIRE JUMPERS TO BE INSTALLED PER TABLE.

-10	-09	-08	-07	-06	-05	-04	-03	-02	-01	QTY. REQ'D	ITEM NO.	PART NUMBER	DESCRIPTION	REF.DES.
											72			
(4)				1	1	1	1	1	2	1	71	60206-01	TY-WRAP T and B NO.TY232M	U4, 16
				-	-	-	-	1	1	1	70	52266-01	CARD EJECTOR, SERIES 101	A
				-	-	-	-	7	-	7	69	49129-01	JUMPER BLOCK	E8-9, 13-14, 15-16, 18-19 E22-23, 24-25, 28-29
				-	-	-	-	1	-	-	68	49126-01	CRYSTAL 8MHz HC18	Y2
				1	1	1	1		1	1	67	49125-01	CRYSTAL 4.194304MHz HC18	Y2
				-	-	-	1	1	-	1	66	49119-01	CRYSTAL 32KHz NO.NTF3238	Y1
											65			
											64			
				-	-	-	-	-	1	-	63	48415-06	EPROM PROGRAMMED SSCU/LUCY CPU-V6.35	U16
											62			
											61			
				1	1	1	-	-	-	-	60	47269-01	EJECTOR, CARD-8IVAR NO.LP-06	A
				-	-	-	1	-	-	-	59	47205-01	SPACER, NYLON, F-FW#6 .2500IA. x .250L6.	Y1
				1	1	1	-	-	-	-	58	47044-01	SWITCH SPDT PCMOUNT RT ANGLE	P2-2, -3, -4
				2	2	2	1	1	1	1	57	46532-01	TRANSISTOR VN2222LM	Q3, 4
				2	2	2	2	2	2	2	56	46531-01	TRANSISTOR VN2222L	Q1, 2
				-	-	-	1	1	-	1	55	45801-01	IMPEDANCE NETWORK-HP-IL	RN2
				1	1	1	1	1	1	1	54	45206-01	RESISTOR PACK 6 PIN 10K SIP	RN5
				1	1	1	1	1	1	1	53	45205-01	RESISTOR PACK 8 PIN 10K SIP	RN3
				2	2	2	2	2	2	2	52	45204-01	RESISTOR PACK 10 PIN 10K SIP	RN1, 4
				2	2	2	1	1	1	1	51	45347-01	RESISTOR 5.1K-1/8W-5%-CF	R17, 18
				1	1	1	1	2	1	2	50	45163-01	RESISTOR 1M-1/4W-5%-CF	R6, 11
				3	3	3	4	4	4	4	49	45158-01	RESISTOR 100K-1/4W-5%-CF	R8, 10, 16, 18
				-	-	-	-	1	-	1	48	45135-01	RESISTOR 90.9K-1/4W-1%-MF	R14
				-	-	-	+	1	-	1	47	45100-17	RESISTOR 10K-1/4W-1%-MF	R13
				2	2	2	-	-	1	-	46	45051-01	RESISTOR 0 Ohm	JP1, CR7
				-	-	-	1	1	-	1	45	45346-01	RESISTOR 220K-1/8W-5%-CF	R5
				-	-	-	1	1	-	1	44	45345-01	RESISTOR 22M-1/4W-5%-CF	R4
				7	7	7	7	7	7	7	43	45000-02	RESISTOR 10K-1/4W-5%-CF	R1, 3, 7, 9, 15, 19, 20
				-	-	-	-	-	1	-	42	44236-01	IC 4B202-2K RAM	U17
				1	1	1	1	-	-	-	41	44197-01	IC 5565/6264/4364-8K-RAM-CMOS	U17

(3) (8)

-10	-09	-08	-07	-06	-05	-04	-03	-02	-01	QTY. REQ'D	ITEM NO.	PART NUMBER	DESCRIPTION	REF.DES.
			-	-	-	1	1	-	1		40	44121-01	IC HP 9100-4226	U3
			-	-	-	1	1	-	1		39	44120-01	IC HP 1LB3-0003	U2
			-	-	-	-	1	-	1		38	44115-01	IC RAM-2K-CMOS	U17
			-	-	-	-	1	-	-		37	44113-02	IC 800-4MHz CPU-CMOS	U4
			1	1	1	1	-	1	1		36	44113-01	IC 800-2.5MHz CPU-CMOS	U4
			1	1	1	1	1	1	1		35	44112-02	IC RL TM CLK-COP1879CE1	U1
			1	1	1	1	1	1	1		34	44109-01	IC MC14532	U19
			-	-	-	-	1	-	1		33	44105-01	IC LM10CLN	U18
			1	1	1	1	1	1	1		32	44096-01	IC 74HC00	U13
			1	1	1	1	1	1	1		31	44095-01	IC 74HC30	U9
			1	1	1	1	1	1	1		30	44094-01	IC 74HC14	U8
			1	1	1	1	1	1	1		29	44093-01	IC 74HC08	U7
			1	1	1	1	1	1	1		28	44092-01	IC 74HC373	U5
			3	3	3	3	3	3	3		27	44086-01	IC 74HC138	U6, 15, 20
			6	6	6	6	6	6	6		26	44084-01	IC 74HC245	U21-26
			2	2	2	2	2	2	2		25	44081-01	IC 74HC32	U12, 14
			2	2	2	2	2	2	2		24	44079-01	IC 74HC74	U10, 11
			-	-	-	2	2	-	2		23	42024-01	DIODE ZENER 1N9738	CR3, 4
			-	-	-	2	2	2	2		22	42019-01	DIODE 1N5817	CR6, 7
			-	-	-	2	2	-	2		21	42008-01	DIODE ZENER 1N753A	CR1, 2
			2	2	2	2	2	2	2		20	42003-01	DIODE 1N9148	CR5, 8
			1	1	1	-	-	-	-		19	41724-01	SOCKET, SMART	U17
			1	1	1	1	1	1	1		18	41716-01	SOCKET 40 PIN DIP	U4
			1	1	1	-	-	1	-		17	41713-01	SOCKET 28 PIN DIP	U16 U17
			-	-	-	-	1	-	1		16	41583-01	HEADER, 9 POS., SINGLE ROW, STRAIGHT	E15-23
			-	-	-	-	1	-	1		15	41562-01	HEADER, 6 POS., SINGLE ROW, STRAIGHT	E24-29
			-	-	-	-	2	-	2		14	41581-01	HEADER, 2 POS., SINGLE ROW, STRAIGHT	E8-9, 13-14
			1	1	1	1	1	1	1		13	41537-01	CONNECTOR NO.072-64114-290	P1
			-	-	-	1	1	-	1		12	41517-01	CONNECTOR 4 PIN AMP	P2
			-	-	-	1	1	-	1		11	41512-01	CONNECTOR 3 PIN AMP	P3
			1	1	1	2	2	1	2		10	40900-01	CAPACITOR VAR, 9 50pF-250V	C6, 9
			1	1	1	1	1	1	1		9	40567-01	CAPACITOR 10uF-25V-10%-TANT.	C16
			1	1	1	1	1	1	1		8	40566-01	CAPACITOR 10uF-6.3V-10%-TANT.	C12
			1	1	1	1	1	1	1		7	40565-01	CAPACITOR 4.7uF-10V-10%-TANT.	C21
(3)	(8)		11	11	11	12	12	11	12		6	40560-01	CAPACITOR .1uF-63V-10%-POLYEST.FILM	C4, 5, 10, 11, 13, 17-20, 22, 24
			1	1	1	1	1	1	1		5	40576-01	CAPACITOR 22pF-200V-10%-CER.	C3
			-	-	-	1	1	-	1		4	40575-01	CAPACITOR 15pF-200V-10%-CER.	C7
			1	1	1	-	-	1	-		3	41010-03	PCB FAB SSCU/SORTS CPU	
			-	-	-	1	-	-	-		2	41010-02	PCB CPU FAB.	
			-	-	-	-	1	-	1		1	41010-01	PCB CPU FAB.	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± DECIMALS .XX ± .XXX ± ANGLES ±

DRAWN E.BEIZERMAN 1-22-87
CHECKED W Yang 7-14-87
APPROVED J. ABDO 7-14-87
MATERIAL
ITC SPEC NO
DO NOT SCALE DRAWING

COMMUNICATIONS TECHNOLOGY
2031 TORRANCE BLVD. • LOS ANGELES • CA 90501 • USA • (213) 515-1000 • TWX 910 343 6910

CPU BOARD ASSEMBLY
SSCU

UNLESS OTHERWISE SPECIFIED REMOVE BURRS AND BREAK SHARP EDGES